

RICE UNIVERSITY

velocity :

MAPPING HOUSTON ON THE DIAGONAL

by
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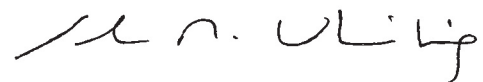
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April 2012

ABSTRACT

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This thesis researches the perception of our surroundings while in motion. The bi-cycle is the primary focus and is conceptualized as an apparatus, once activated by its rider. New measure is applied to the city through the spatiality of the bicycle from which new mappings and experiences emerge. Liberated from the restrictions of the urban grid, the rider constructs new forms of judgement enabling him to navigate the “diagonal.” The architectural project is sited in the “vehicular shadows” of Houston and proposes the Veloduct as a new strategy for occupying and experiencing a new velo-centric landscape. A traversable canopy structure stitches together the shards of unclaimed ground acting as a megastructure under which formalized program and event spaces are distributed. The Veloduct simultaneously creates new spatial experiences and recasts old ones from a new perspective, that of the bicycle.

ACKNOWLEDGMENTS

Thank you to Mark Wamble, my thesis advisor, for knowing when provoke, when to smile and nod and when to leave me to my own devices.

Thank you to my classmates for reminding me to breath (or have a beer) and inspiring me with their own works and ambitions.

Thank you to my parents, also for reminding me to breath (or have a beer) and showing up when it counted to see the product of my labors.

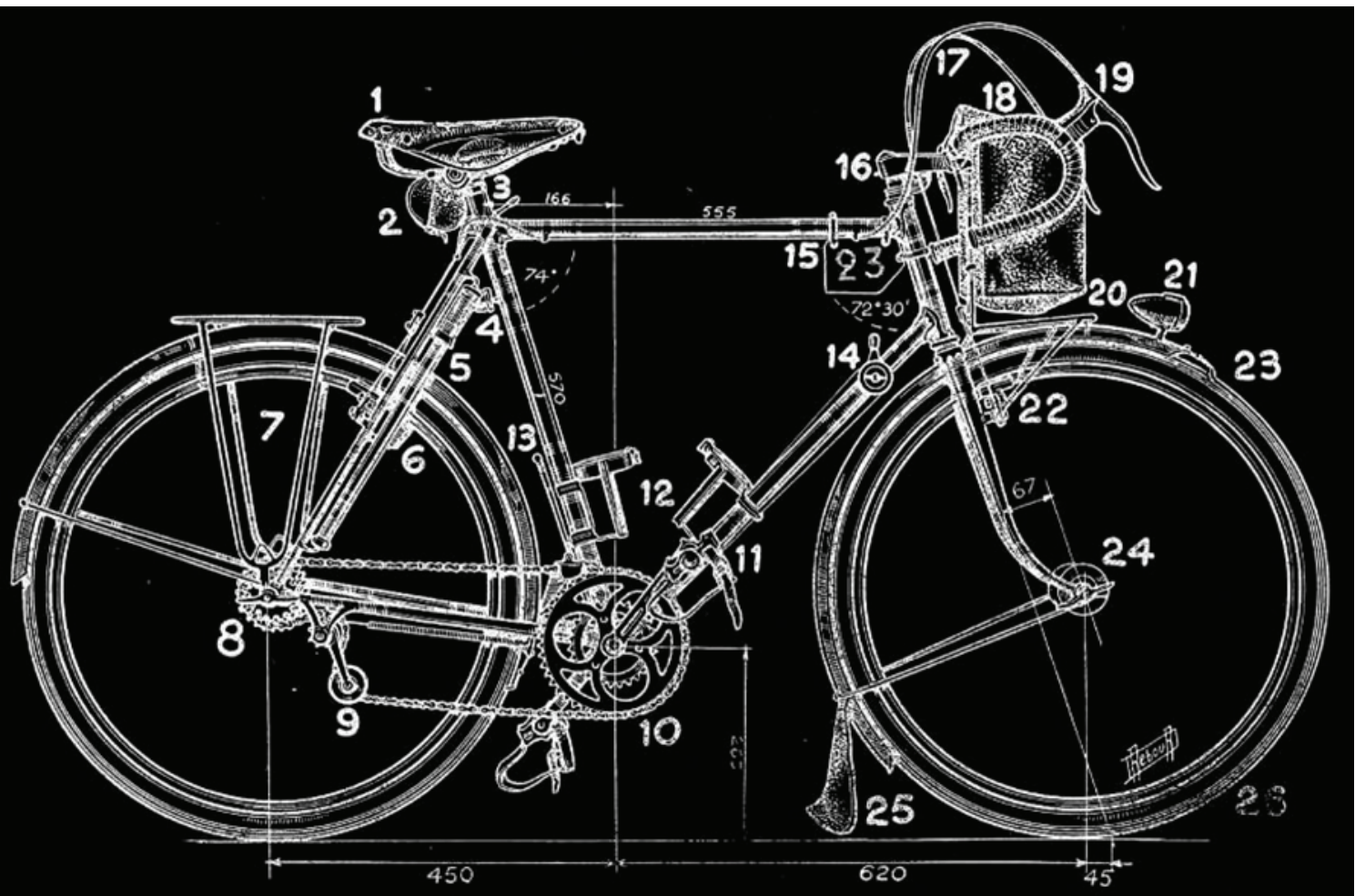
Thank you to my Grandmom Dorothy for supporting her grandchildren's educations above everything else.

Thank you to my Grandpop Pete for showing me how to be tireless while keeping life in perspective. I hope I make you proud.

Thank you Kristin, for being there with me for one of my greatest adventures. You tolerated and supported me unconditionally. I couldn't have done it without you.

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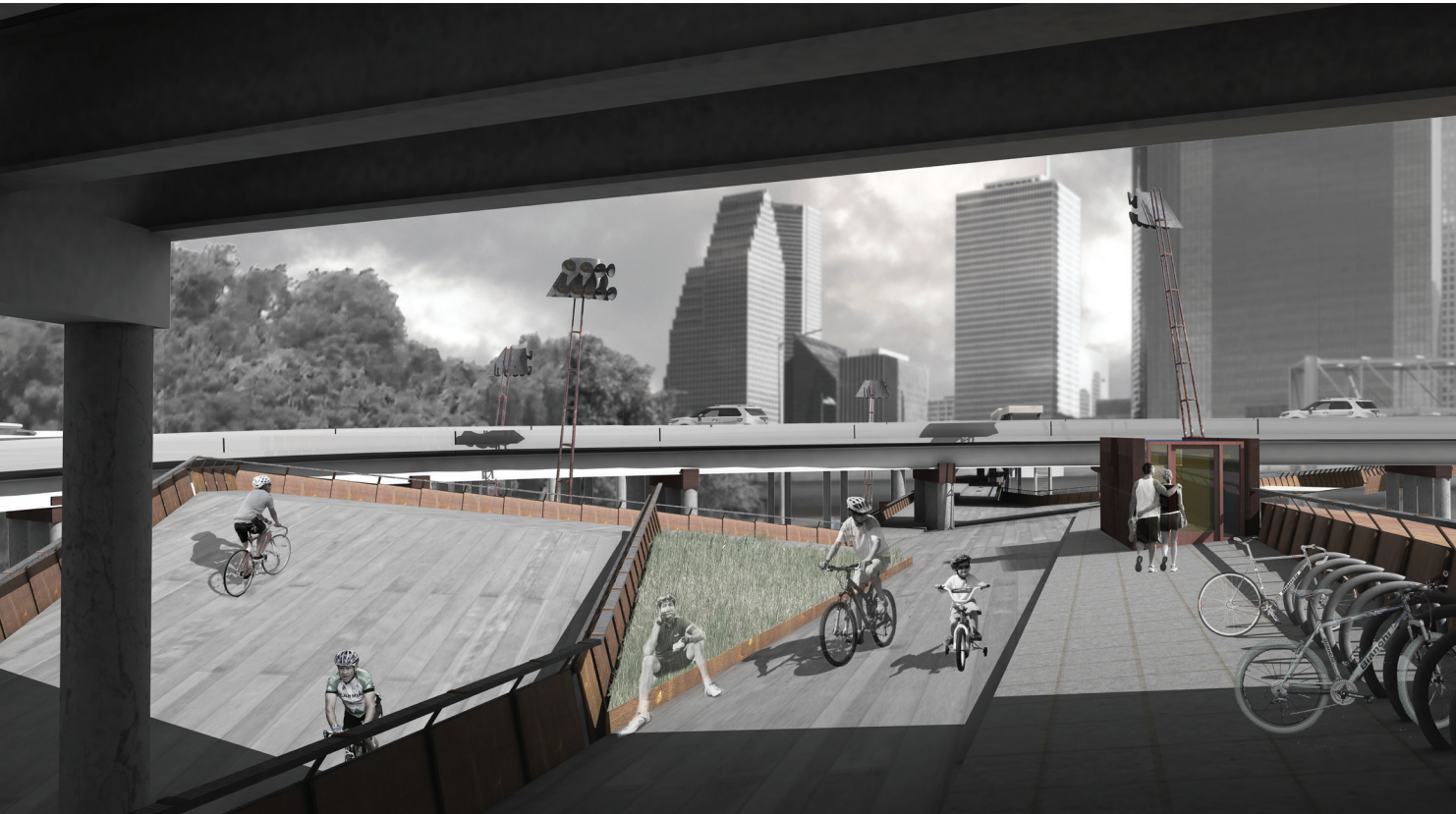


bicycle / *bisik* / *n.*

- 1 a vehicle composed of two wheels, propelled by pedals and steered with handlebars attached to the front wheel
- 2 an apparatus adept at navigating the urban diagonal by means of trajectories and imprvovisation.
the altered state of perception produced in its rider is known to lead to fits of rage, euphoria and enlightenment.

Even as our cities grow and prosper they begin to choke under the density of their own populations and infrastructure. Automobile cities, such as Houston, have not even been able to satisfy the simultaneous demands for speed and capacity. The reactionary solution to this has been perpetual outward expansion into open, unobstructed territory. Instead of the singular accommodation of the automobile, what if alternative spatial interventions were imagined that could occupy the urban patches, discarded by a car-centric society. If the automobile once speared our charge out to the suburbs, the bicycle will lead the raucous parade back into the metropolis.

The bicycle is not a symbol of hardship or compromise, ridden by the have-nots and non-conformists. It is a liberation. It is an unacknowledged extension of our American ideals. An exercise of individual will and imagination embodied in a simple machine of limitless latent potential. In the hands of an alert and confident rider the bicycle becomes an instrument for navigating the modern urban landscape on the diagonal. This spatial mind set avoids description by the nomenclature of established institutions, laying unclaimed and unvalued awaiting new forms on habitation.

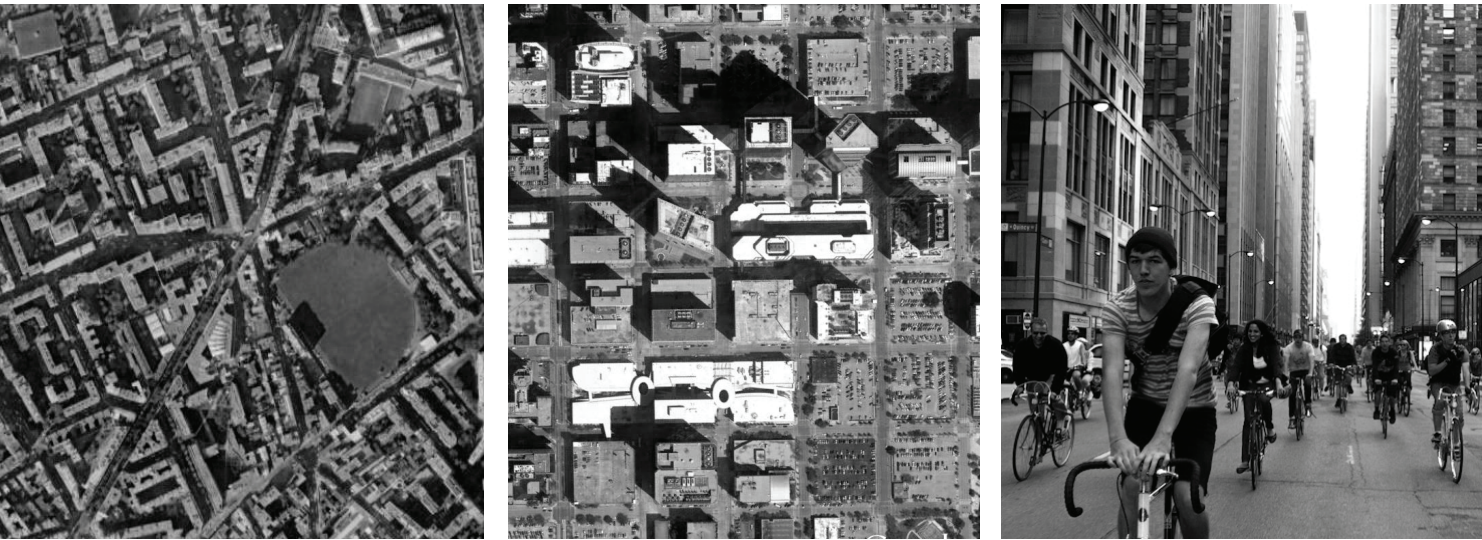


VELODUCT CANOPY AT GULF FREEWAY

Viewed as an apparatus, the bicycle can be understood to produce two altered identities. One identity is that of the city as it is perceived through the mask of the bicycle at velocity. The other identity is the one projected back into the city by the rider as it is produced by the actions of the rider. These new constructed relations differentiate the cyclist's city from the institutionalized urban experiences of the driver or pedestrian. For the cyclist a new map of the city emerges. One constructed not by grids, but by the improvisation and judgement required to inhabit the diagonal landscape.

The diagonal cannot be fabricated or constructed. It emerges through the use and appropriation of space. This suggests an architecture that both supports the needs of the cyclist and challenges their unique spatial perceptions. Through the design of a veloduct, this project proposes a landscape that recasts the bicycle as the primary means of accessing and experiencing architecture. Drafting off the shadows cast by vehicular habitation, a social infrastructure is produced that elevates and projects the presence of bicycle culture in Houston.

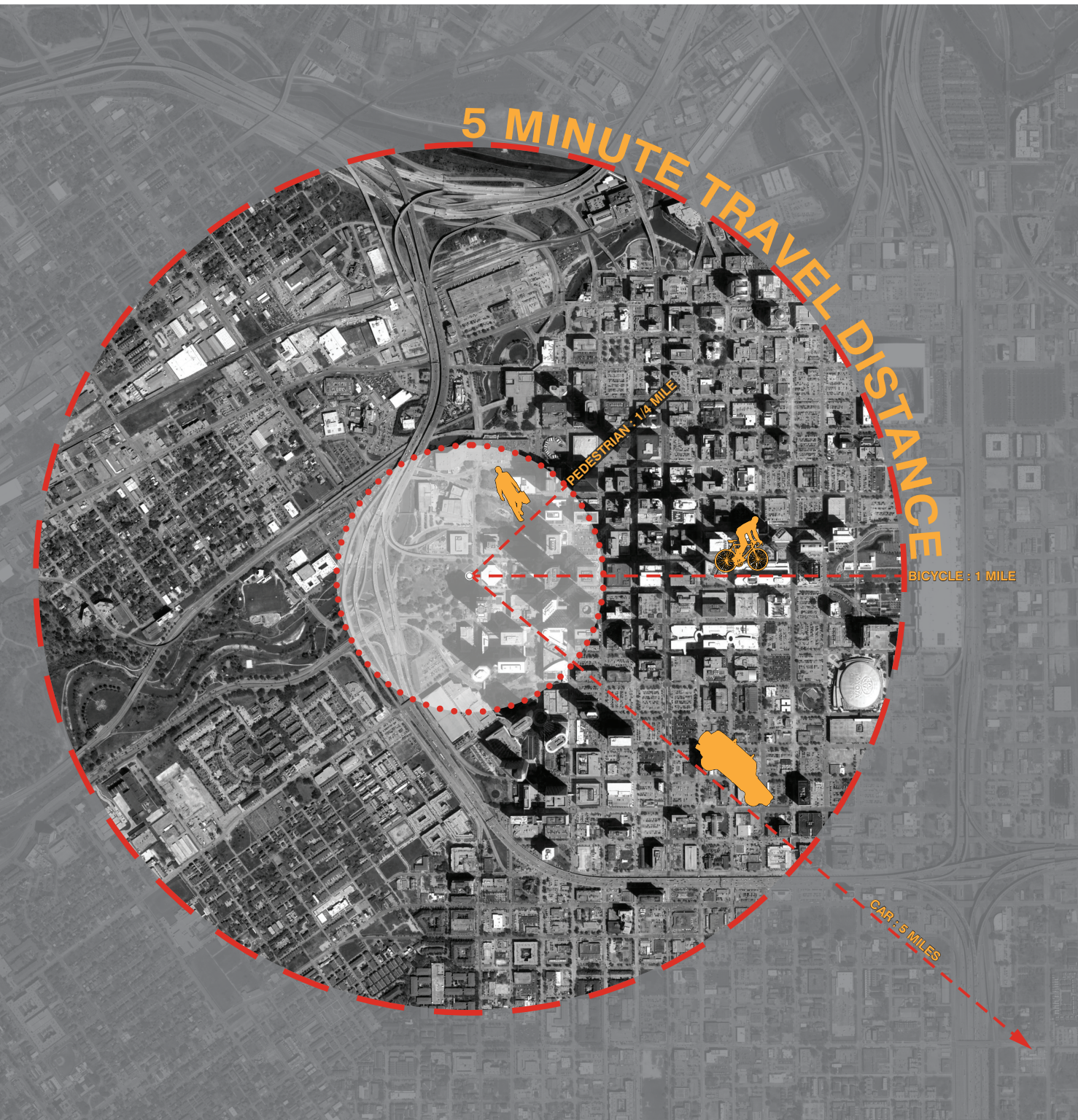
THE BICYCLE AS APPARATUS



A diverse hierarchy of transportation is a primary force determining how cities emerge and territorialize. How you choose to navigate this urban space shapes your perception of it. The side-ward projection of a train produces a layered landscape of depth that glides by at varying speeds. The hard frame of a car windshield locks the passengers view straight ahead into a tunnel of focus, pivoting with the trajectory of the car. The rhythm of a brisk walk produces a variation of experience where the freedom of focus and observation are limited by distance and speed. Our choice (or lack) of transit predetermines the way in which we perceive and document our travels within our urban environments. As we slip into a routine of efficient passage we risk indoctrinating our senses to the scenes that pass before us, and falling ignorant of the spaces just beyond our view.

American cities have for the most part collapsed into a monoculture of automobiles with little infrastructure or consideration for other modes of transit. Over time the form and character of cities have conceded to the car's mobility and specificity. The demand placed on our urban systems by the vehicular-bound individual has maxed out the spatial resources available to accommodate vehicles in motion or repose.

Your car's most efficient use is now one of intercity travel and commuting from the suburbs. The congestion of our cities, even those designed for the automobile, have left a gap in their hierarchy of transportation and communication. Technology has developed to the point that you can cross continents faster than you can cross town. This is not a problem for planning or infrastructure to fix. This is an opportunity for



the reemergence of a bicycle culture that thrives in the density of our modern cities. I would argue that urban development has reached a point where the bicycle's role could be rewritten as a versatile tool for local habitation.

The bicycle, though ubiquitous in the domestic setting as a childhood vocation, has been banished to the fringes of urban transportation since the inception of the automobile. Within this fringe a resourceful culture has emerged that view the bicycle as a liberating instrument, allowing them to traverse the established urban grid in unexpected and inventive ways. In order to advance cycling as a popular urban lifestyle it must be identified beyond the embedded stereotypes of children, tree huggers, the anti-establishment or the Dutch. So what kind of unifying concept can be used to frame this hodge podge of enthusiasts.

The bicycle, of course!

Specifically the world produced by the relationship of bicycle and rider. In its simplest sense the bicycle is a precise, technical machine. Layered with the social and spatial conditions the rider introduces, it can be understood as an apparatus. The bicycle as apparatus operates as a device through which you, both perceive and interpret the city. And project your identity back into the milieu.

Atop the saddle you apply new measure to the city. You are no longer bound to your stride. Each step is exponentially magnified. You glide. You drift. You coast the interstitial realm of the city. You are a modular of vectors.



The circumference of the bicycle expands your awareness of the city. The effort it takes to travel a block, five blocks, a mile, vanishes. What was far is near. What was in the blind spot of your car commute, broadens into a rich layered fabric. Emphasis shifts from points to trajectories. From destination to journey. Neither *there* or *there*, but always *here*, always in the moment. Arrival and departure are mirrored faces of the same instant.

By bicycle the city is smaller, more accessible. But as the city shrinks the street expands, into a broad striated channel of obstacles and stimuli. Your senses adapt to this new landscape. Information rushes through a narrow cone of detailed vision, smearing grossly, outward to the limits of your optical awareness. You learn to interpret and rely on the blurred content of your periphery. It is from this grainy continuity that most of your experience is sampled and filtered into a coherent montage. Storefronts, car doors, pedestrians, food carts, missed turns all lurk in this fuzzy realm. Resolution submits to Impression.

Through your bike you remap the city. Topography, broken pavement, windy streets, shortcuts, ghost bike intersections, places to lock your bike. You construct a new city based on how you see and move on the bicycle. The topography is ever being redrawn as skills adapt, conditions change, and new routes are explored. As you chart this sensorial map you are shaping an image not only of the city but also of yourself, defined by the way you occupy the urban grid and confront its other inhabitants.

NAVIGATING THE DIAGONAL

Your bicycle is a mask. One you wear whenever you climb over your saddle. This is your opportunity to construct a new identity within the city. You are both car and a pedestrian and yet neither. You exist between them. On the diagonal.

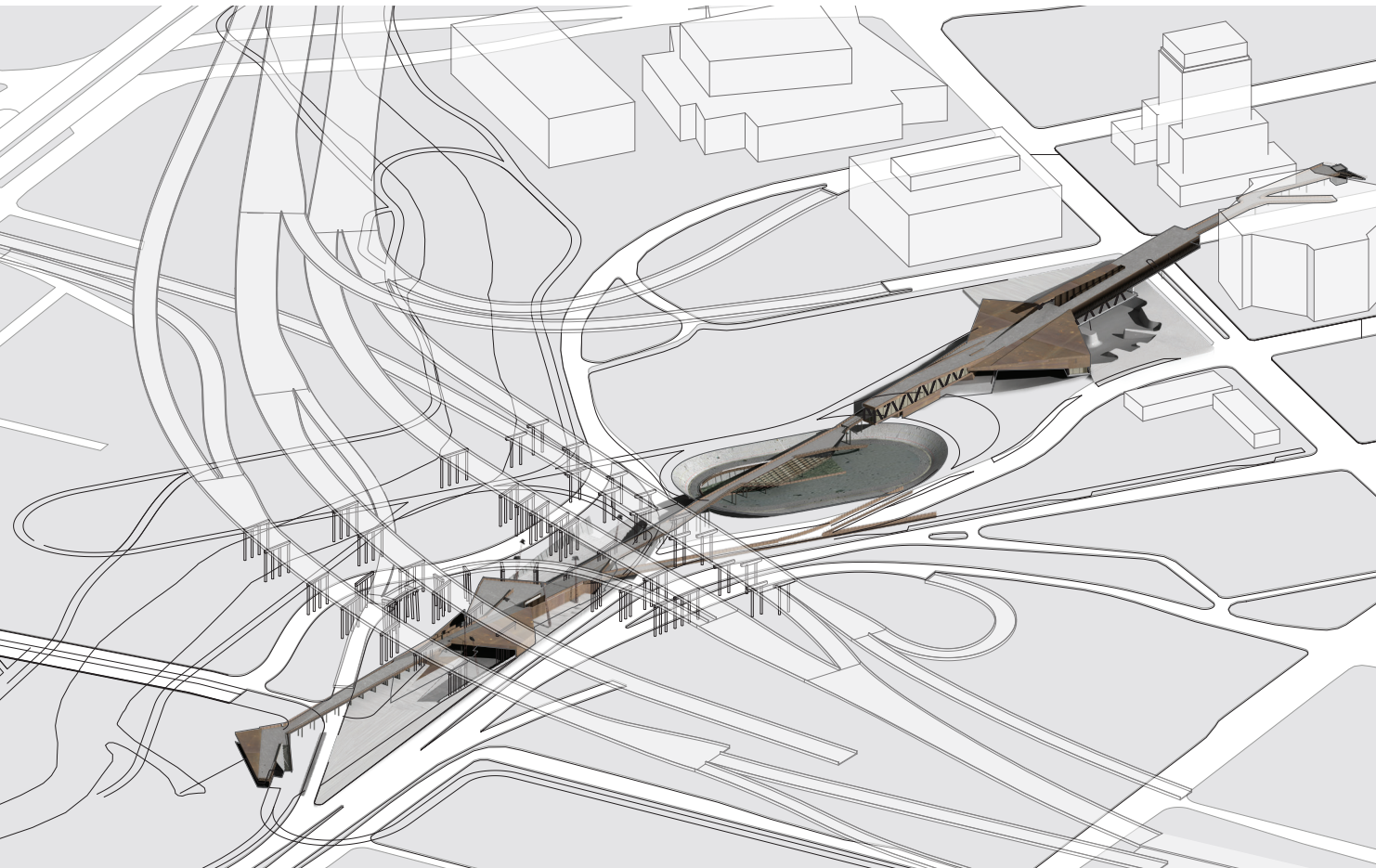
On a bicycle you have access to roads, sidewalks, parks, parking lots. You are no longer limited to the existing grid. You can move in every direction, free to delineate your own trajectory. However, the diagonal has its own set of physical, social, and judicial relationships.

Judicial relations within the diagonal are fuzzy. Most ordinances attempt to frame the cyclist as a motor vehicle. And those that pertain specifically to cyclists leave much room for interpretation. Enforcement is minimal, conditional, and inconsistent. The cyclist's status is ambiguous. He is liberated through lack of inclusion.

With this freedom comes new reliance on judgement. Accommodation of the existing system can put the cyclist at risk. Total disregard will bring harsher enforcement in an attempt to regulate the diagonal. From the velo-centric maps you construct, a new landscape or velo-scape emerges, that defines your relations to the city.

This map is a pact drawn by you the individual. But it has implications for all cyclists traversing the diagonal. And their interactions with the a wider public. A coherent (though not necessarily consensual) identity of the cycling community is important if the bicycle is to emerge as a prominent and respected form of urban transport.

TERMINAL VELOCITY



I am proposing the design of what I am calling a velo-duct to support a strong image of the bicycle conceived as apparatus within the rest of the city. As a form of both social and physical infrastructure the velo-duct acts as a hub for bicycle related activities and a thoroughfare which focuses the trajectories of cyclists traversing the bayou city.

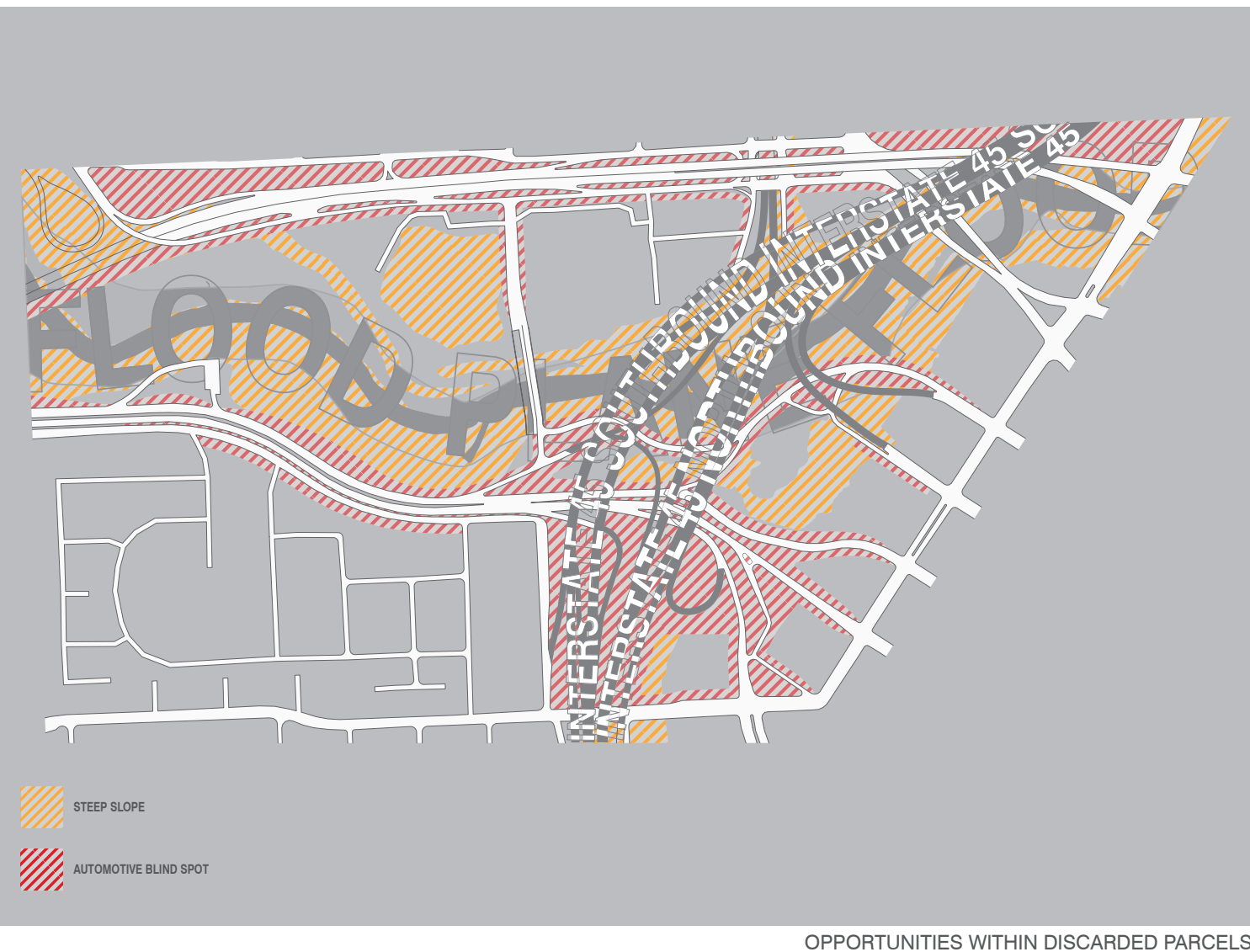
The trajectory is favored over the point. Improvisation is favored over continuity. And feedback or resistance produces a heightened state of awareness, which in turn responds to the ever changing site conditions. Strategies that embrace the cyclists velocentric perception challenge them to continually exercise their diagonal judgement.

As soon as the diagonal is acknowledged it begins to fold back into existing norms. I don't believe it can be explicitly designed or fabricated. Architecture can, however, anticipate conditions in which the diagonal thrives. Through overlays of flexibility, resistance, the designed and the ad hoc at scales of architecture, infrastructure and the urban, the architect can encourage the appropriation of this new velo-centric realm by those navigating the diagonal.

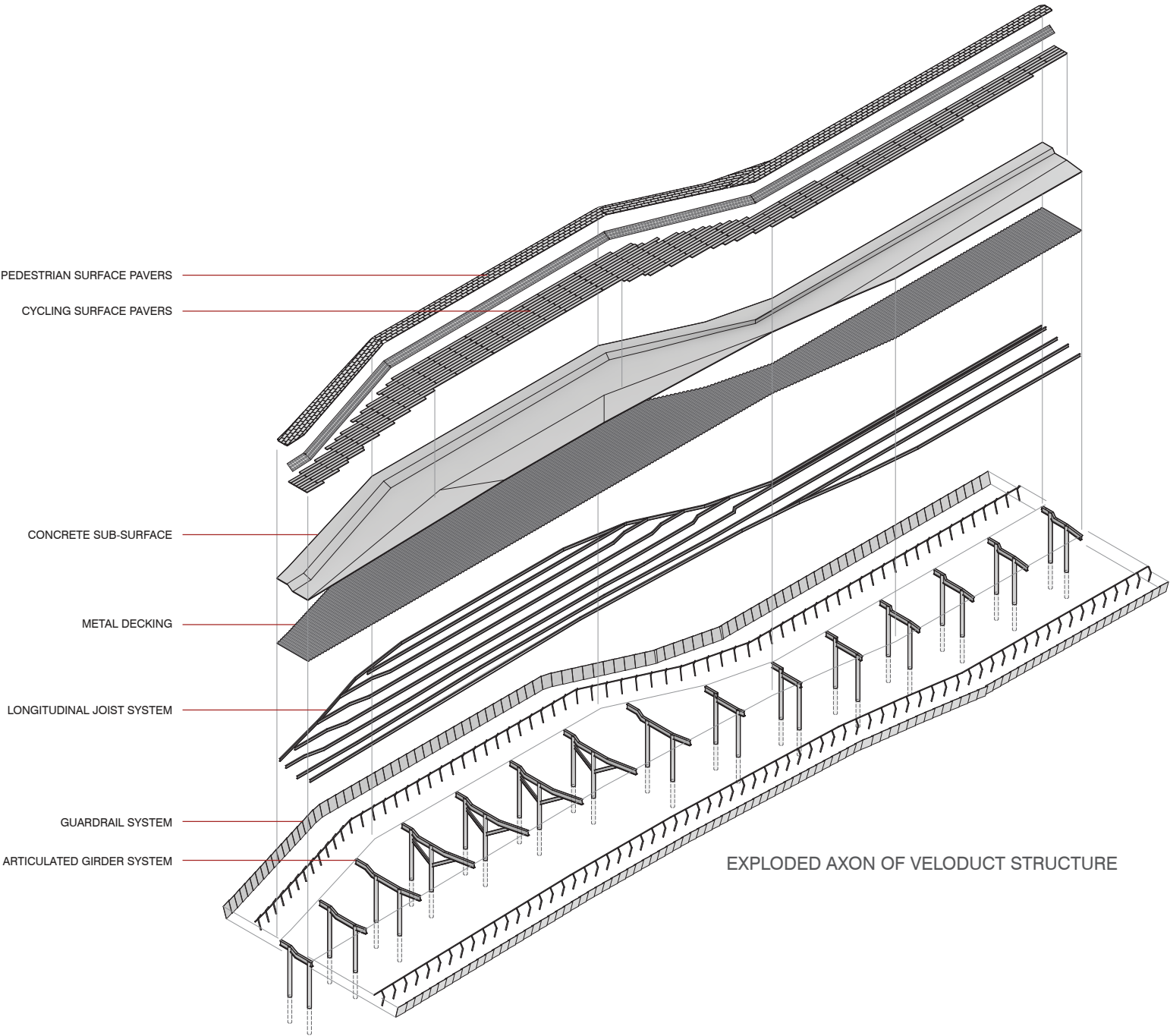
DRAFTING OFF CAR CULTURE

Houston is a city of set backs and right of ways. It is also a city that has grown up around the automobile. These conditions have produced an abundance of space scattered across even its most dense urban fabric that sits vacant. These shards are the shadows produced by the mobility and accommodation of the automobile. High speeds, merging city grids, turning radii, overpasses access ramps and the green void of Buffalo Bayou have carved the periphery of downtown into an archipelago of unclaimed territories. Within the dexterity of the bicycle and the ingenuity of its culture lies the future potential of these vehicular shadows. Bicycles regularly transgress these borders anyway. What architecture can offer is a vision and a strategy that stitches these scraps together, at once creating a new velo-centric landscape and subverting the bicycle's relationship to existing spatialities.

The goal is not to overthrow car culture as it exists, but to find opportunities within the formalized institutions it has produced to carve new paths, not parallel but diagonal to the old ones. We seek not a new city, but new layers in an existing one that will begin to weave a new hierarchy of mobility and urban experience.

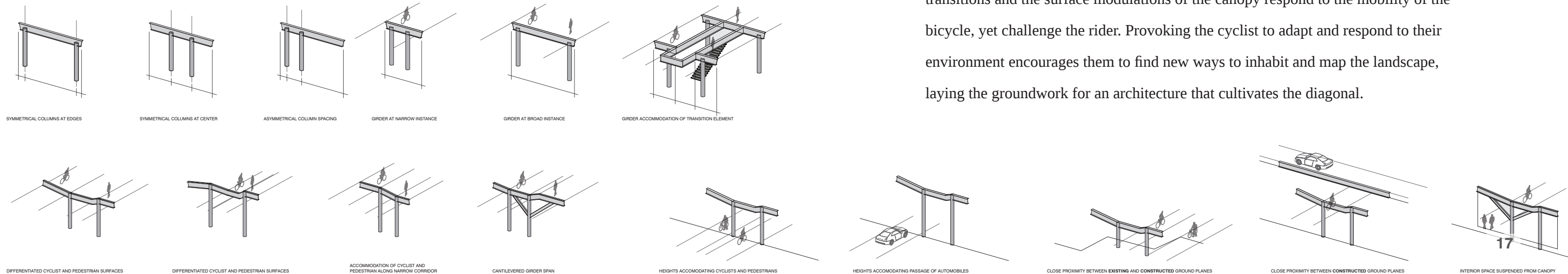


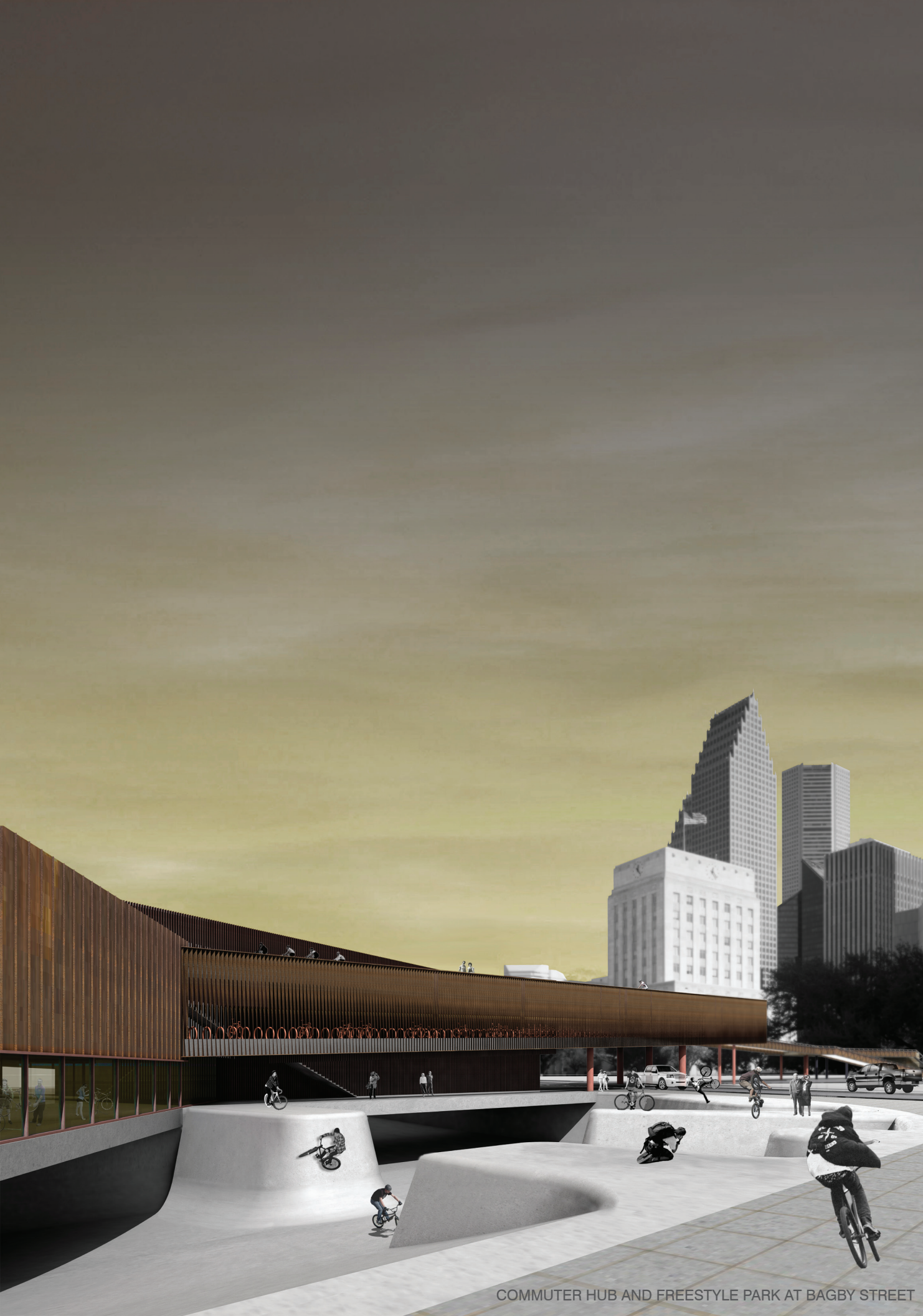
DEPLOYMENT STRATEGIES



The Veloduct is comprised of a canopy structure that provides cyclists with a traversable surface across the myriad of vehicular shadows along the edge of Buffalo Bayou and Downtown Houston. A strategy was conceived that was flexible and generic enough that it could be deployed across a varied topography and customized on-site to unanticipated conditions. Within the redundancy of the structural system lies opportunity for modulation of the canopy’s surface. Variety in width, slope, materials, plantings, vertical transitions are all designed into the system to create unique and responsive moments along the length of the Veloduct. From the generic emerges the specific.

The structure of the Veloduct can act as a stand alone system or graft onto the structures of existing buildings and infrastructure. This reaffirms the desire to simultaneously create new spatial experiences and recast old ones from a new perspective (and velocity). Just as the structural system ties into existing ones, so too does the circulation. Vertical transitions between the canopy and ground circulation are provided periodically along the traversable surface. Several typologies of vertical transitions exist that act to regulate who can gain access and at which points along the system. These transitions and the surface modulations of the canopy respond to the mobility of the bicycle, yet challenge the rider. Provoking the cyclist to adapt and respond to their environment encourages them to find new ways to inhabit and map the landscape, laying the groundwork for an architecture that cultivates the diagonal.





COMMUTER HUB AND FREESTYLE PARK AT BAGBY STREET

THE HOUSTON VELODUCT

The canopy of the Veloduct is the unifying element across the entire system. It finds ways to adapt and interject itself into the existing fabric. By contrast the programmatic elements, distributed along the Veloduct situate themselves in the shadows that while isolated are conducive to more established program. There are both a formalized set of programs, such as cafe, workshop, gymnasium, and commuters lockers, and a set of specialized event spaces, such as velodrome, bike polo courts, and a freestyle bowl. These program are realized as distinct destinations along the veloduct. They are, however, physically isolated from the city grid and from each other. It is the canopy, the trajectory, the journey that threads them all together. This strategy again emphasizes the bicycle's spatiality, one focused on vectors and perception en route, yet undeniably tied to destination and purpose.

Bicycle culture is not singular. I have tried to construct a unifying view of it based on the bicycle itself, but even the bicycle comes in many forms. It is through this design project that, architecture's ability to simultaneously represent both a generic public and a specific public was tested. Elements of the veloduct envelope a broader cycling culture. The canopy and formalized program such as the cafe and gallery accommodate the physical occupation and social interaction of a wide range of cyclists. Two wheels are welcome, one and all. The specialized event spaces appeal to more discrete subcultures within the cycling community. Track bikes thrive on this surface, bmx'ers shred here, drink your beer and practice your polo swing under there. These activities draw out the peculiar traits of different sects of cyclists that enrich the culture as a whole and juxtaposes it against the all inclusive nature of adjacent programs. Through the activation of both the generic public and the specific public there are moments of overlap in participation and observation. Through the simultaneous exchange of activity and form a culture is stimulated at all levels of participation.



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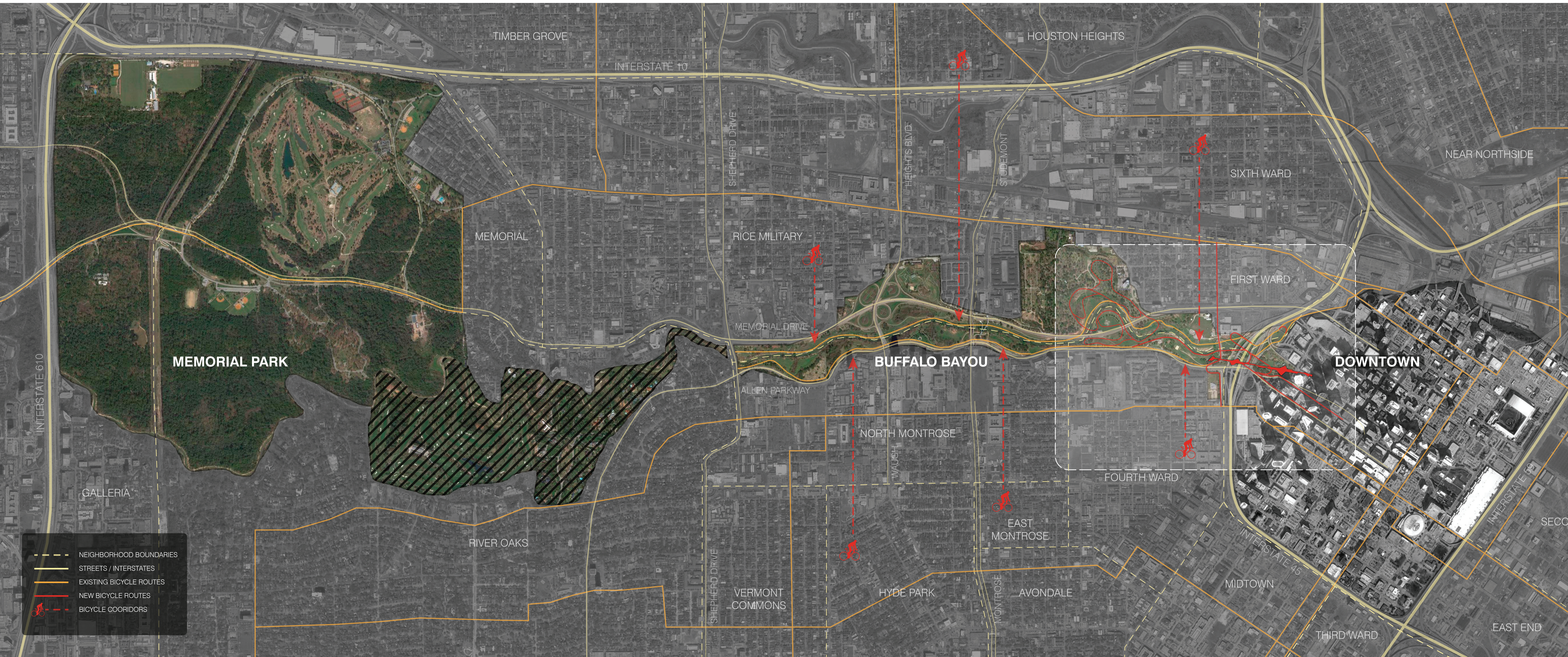
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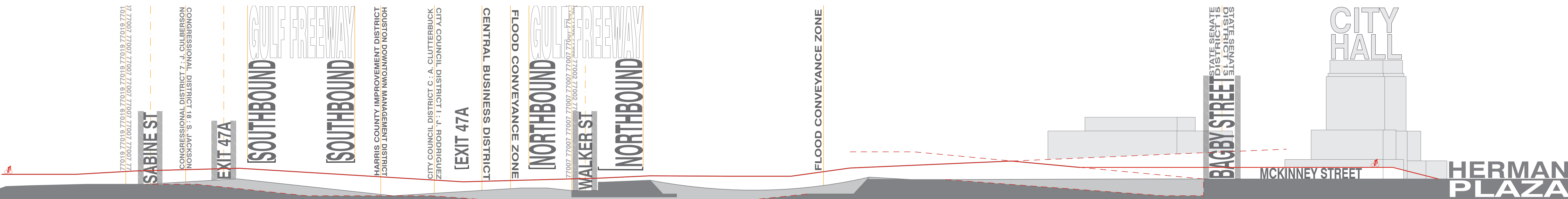
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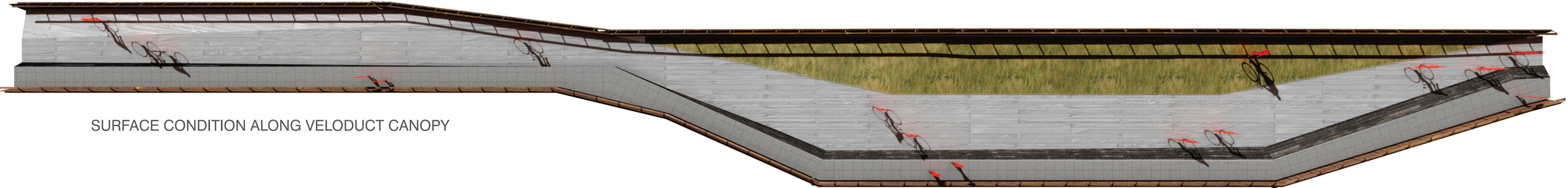
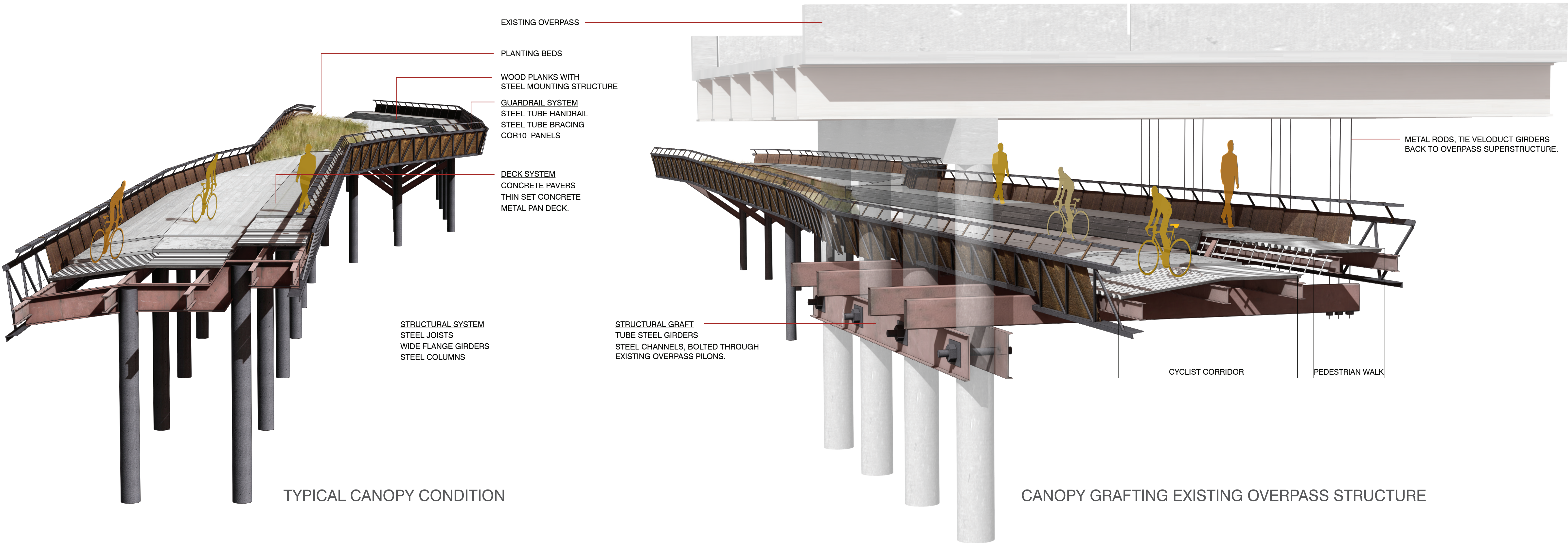
BUFFALO BAYOU TRANSPORTATION CORRIDORS



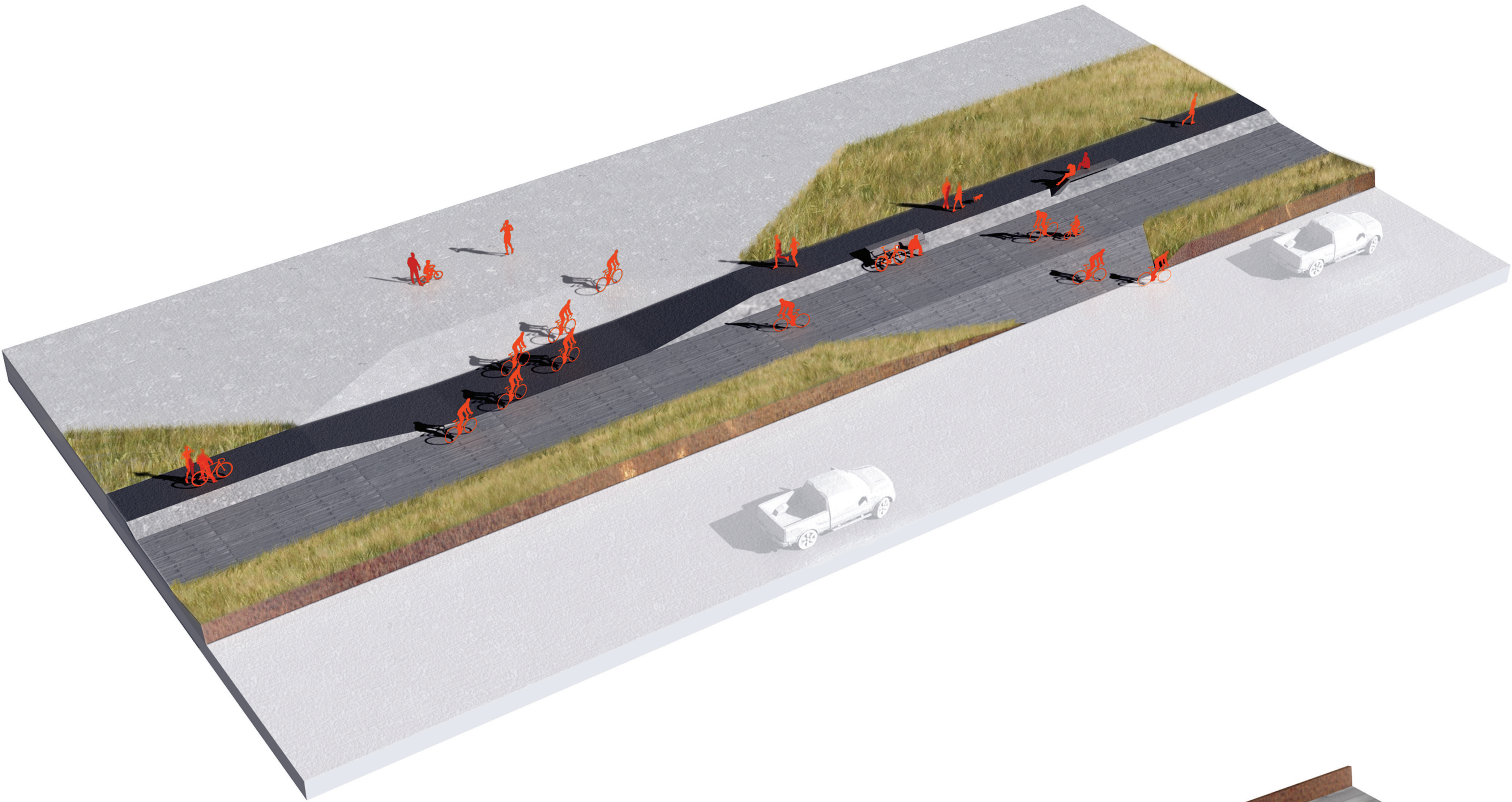


SITE PLAN WITH BICYCLE CIRCUITS

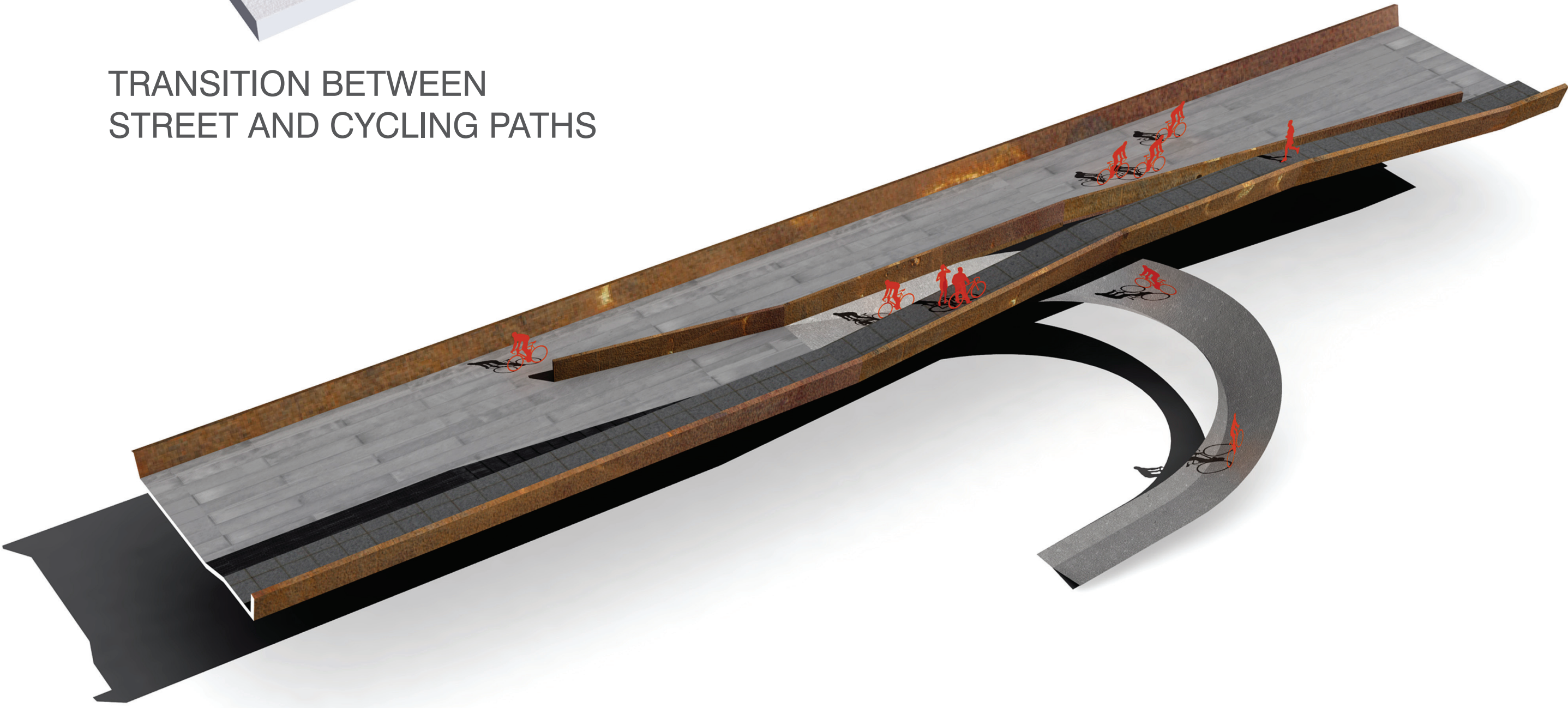
DEPLOYMENT STRATEGIES



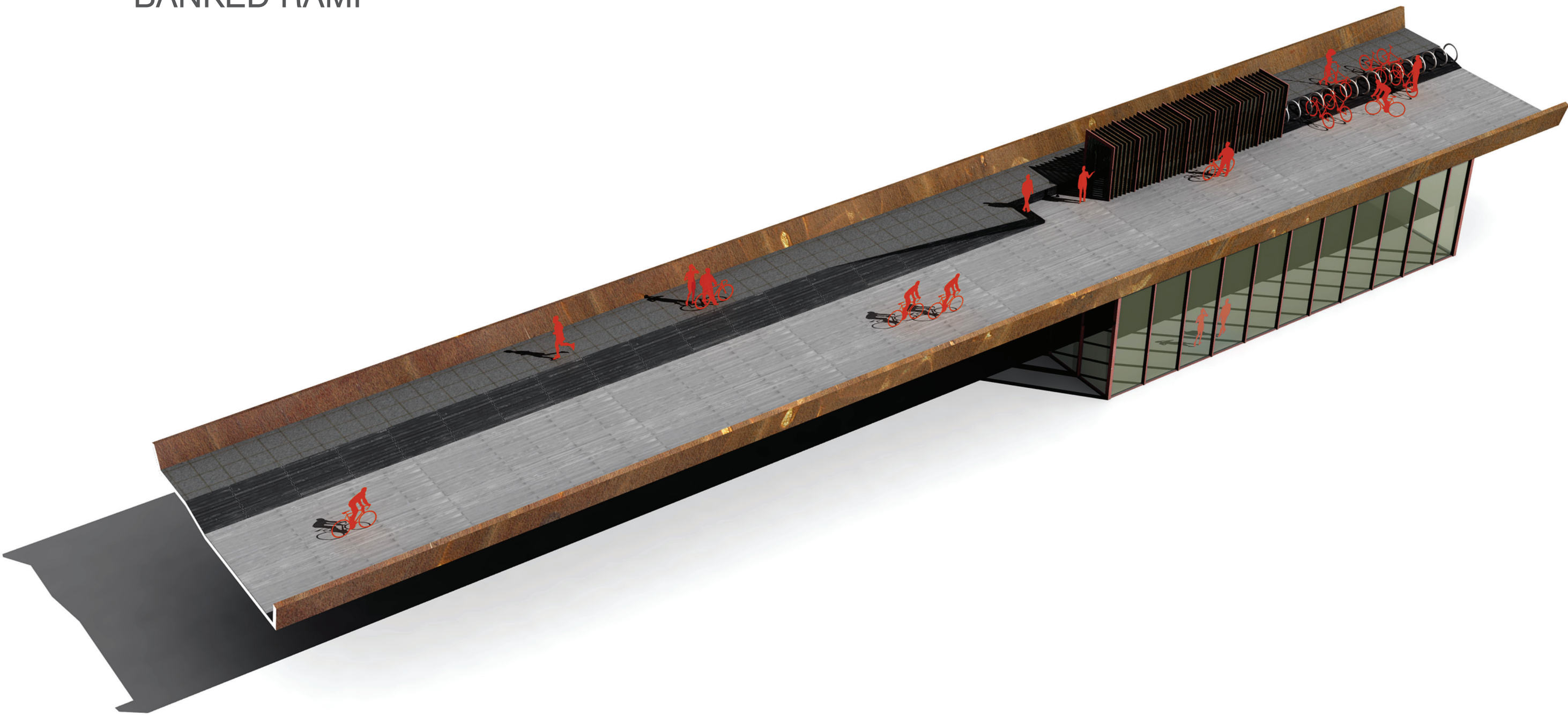
DEPLOYMENT STRATEGIES



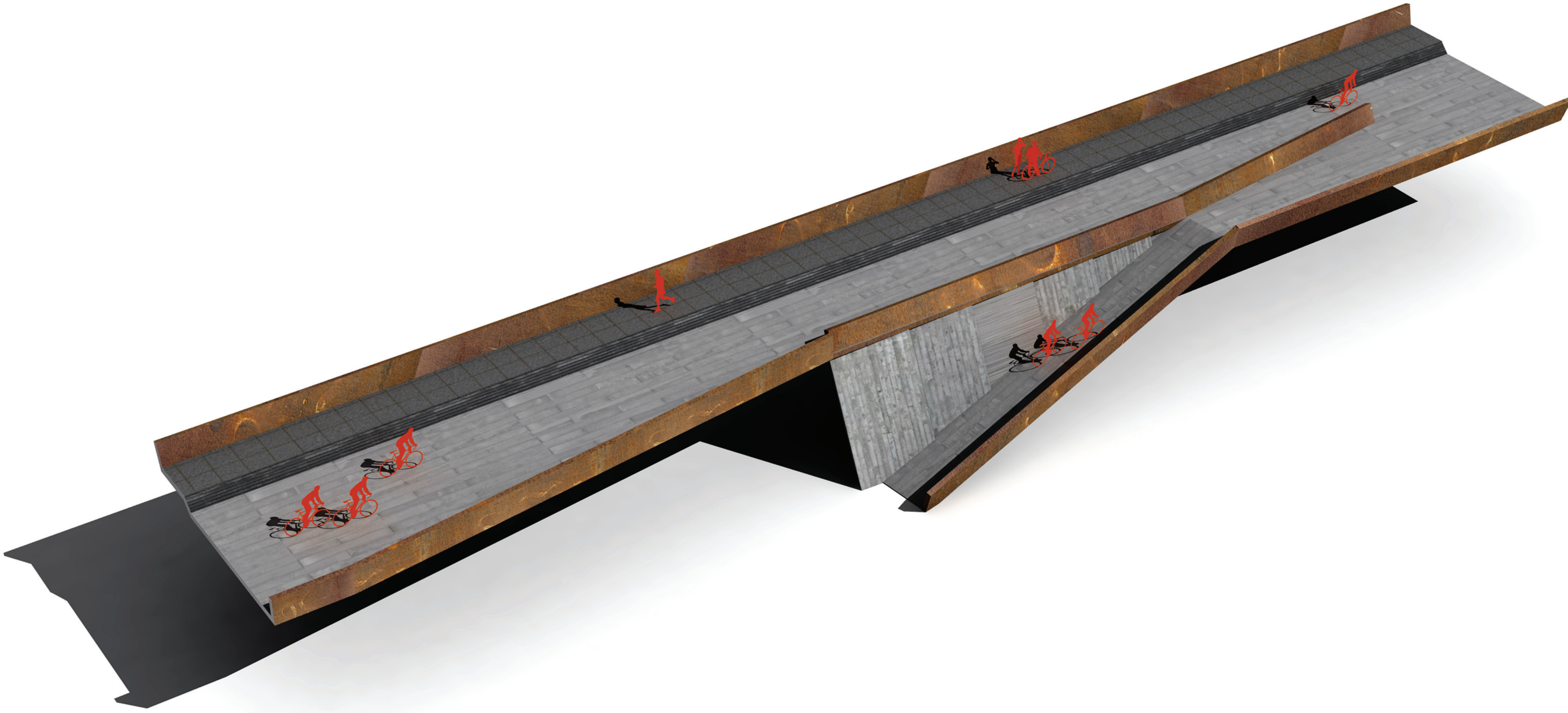
TRANSITION BETWEEN
STREET AND CYCLING PATHS



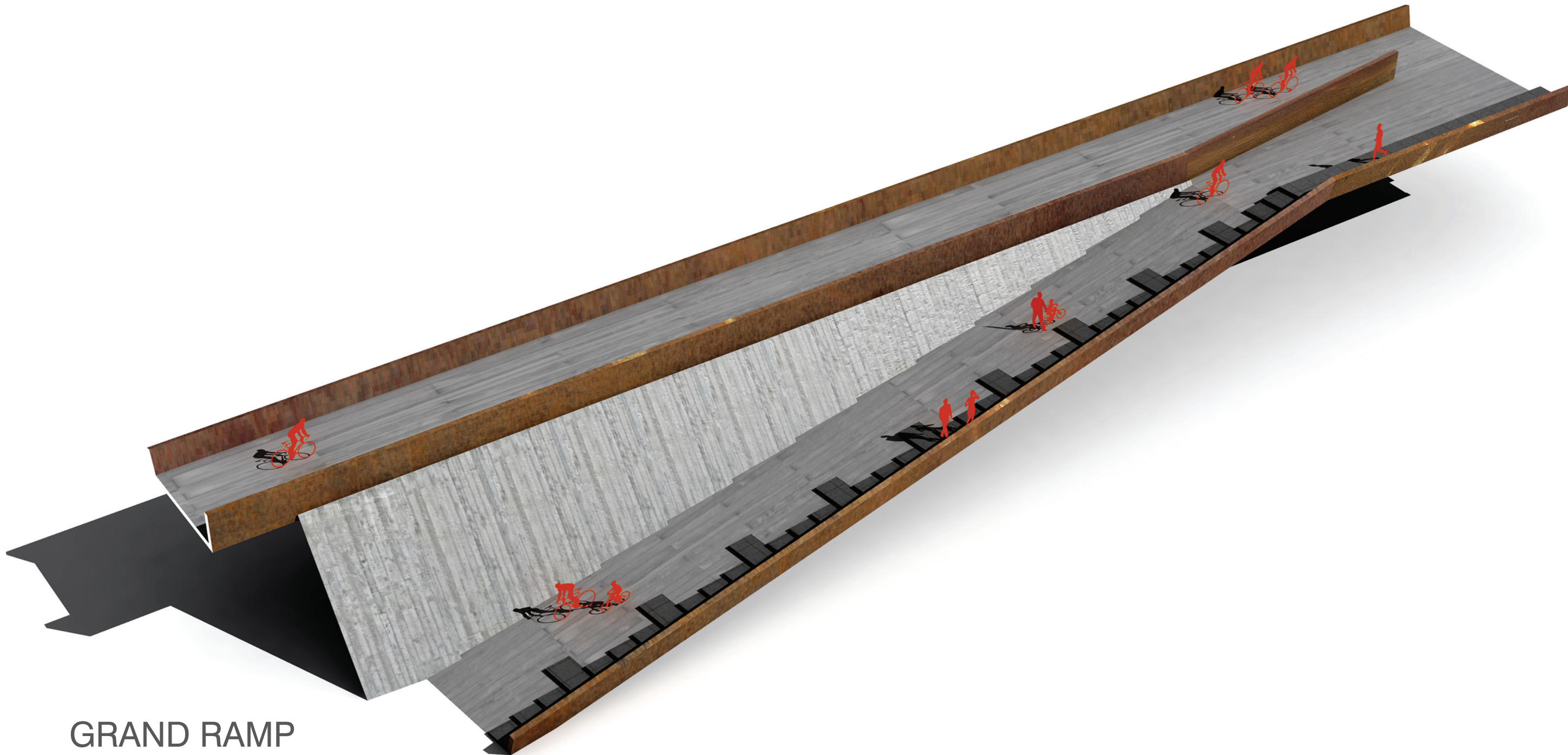
BANKED RAMP



CANOPY STAIR AT INTERIOR PROGRAM

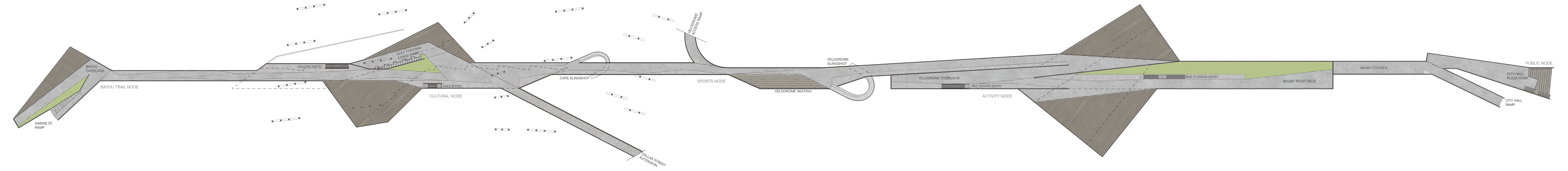


CYCLIST RAMP

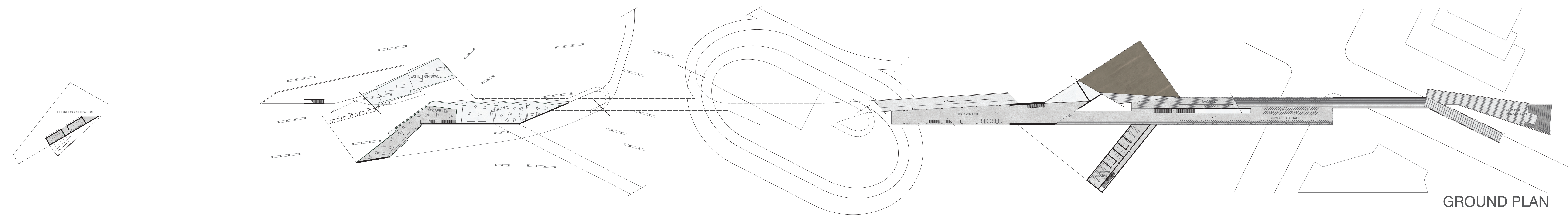


GRAND RAMP

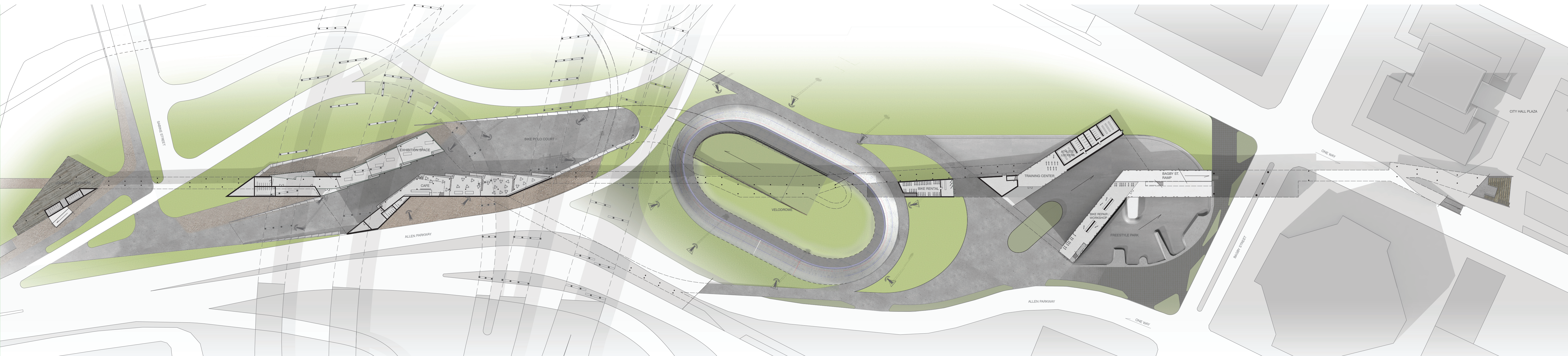
CANOPY LEVEL

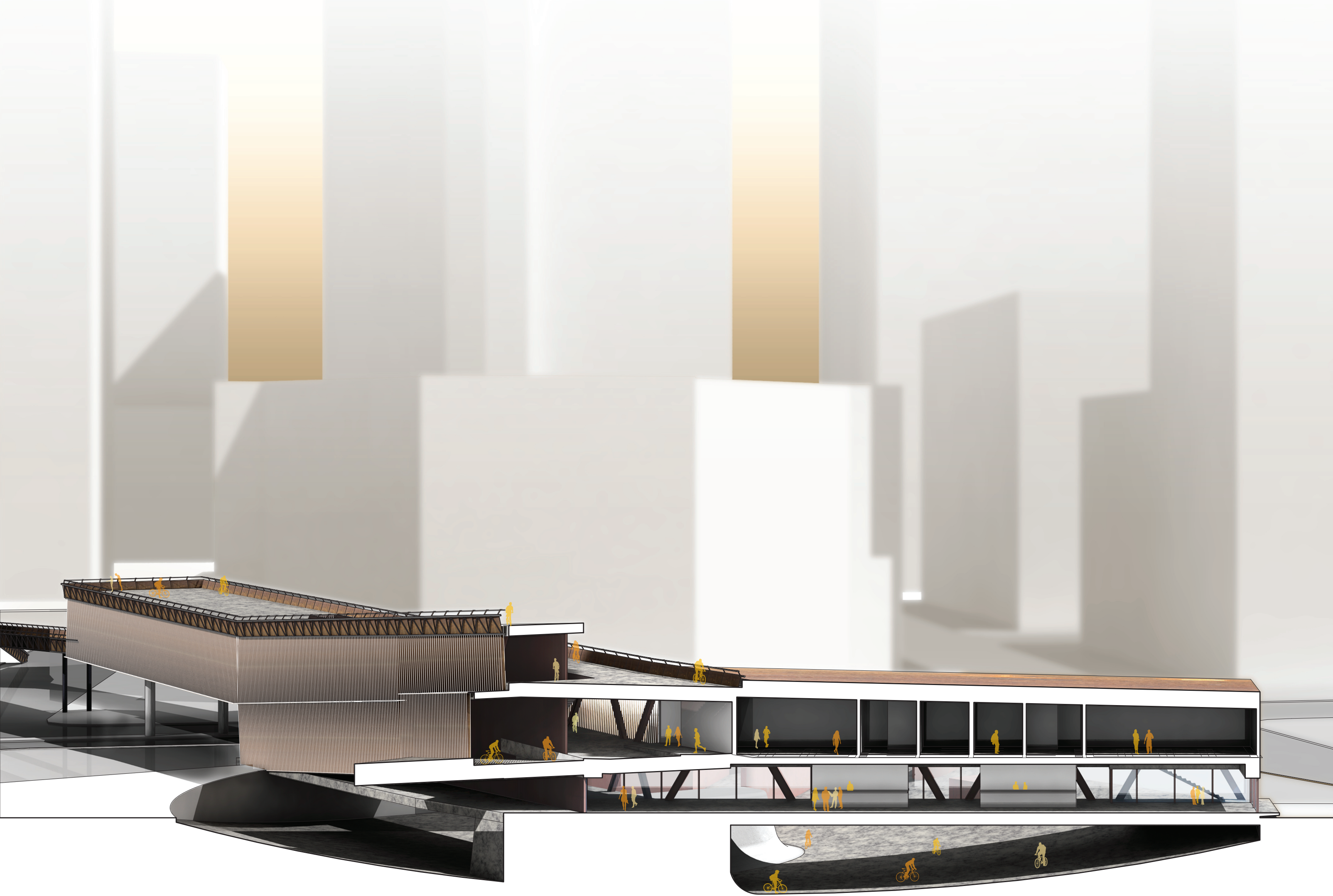


UPPER LEVEL

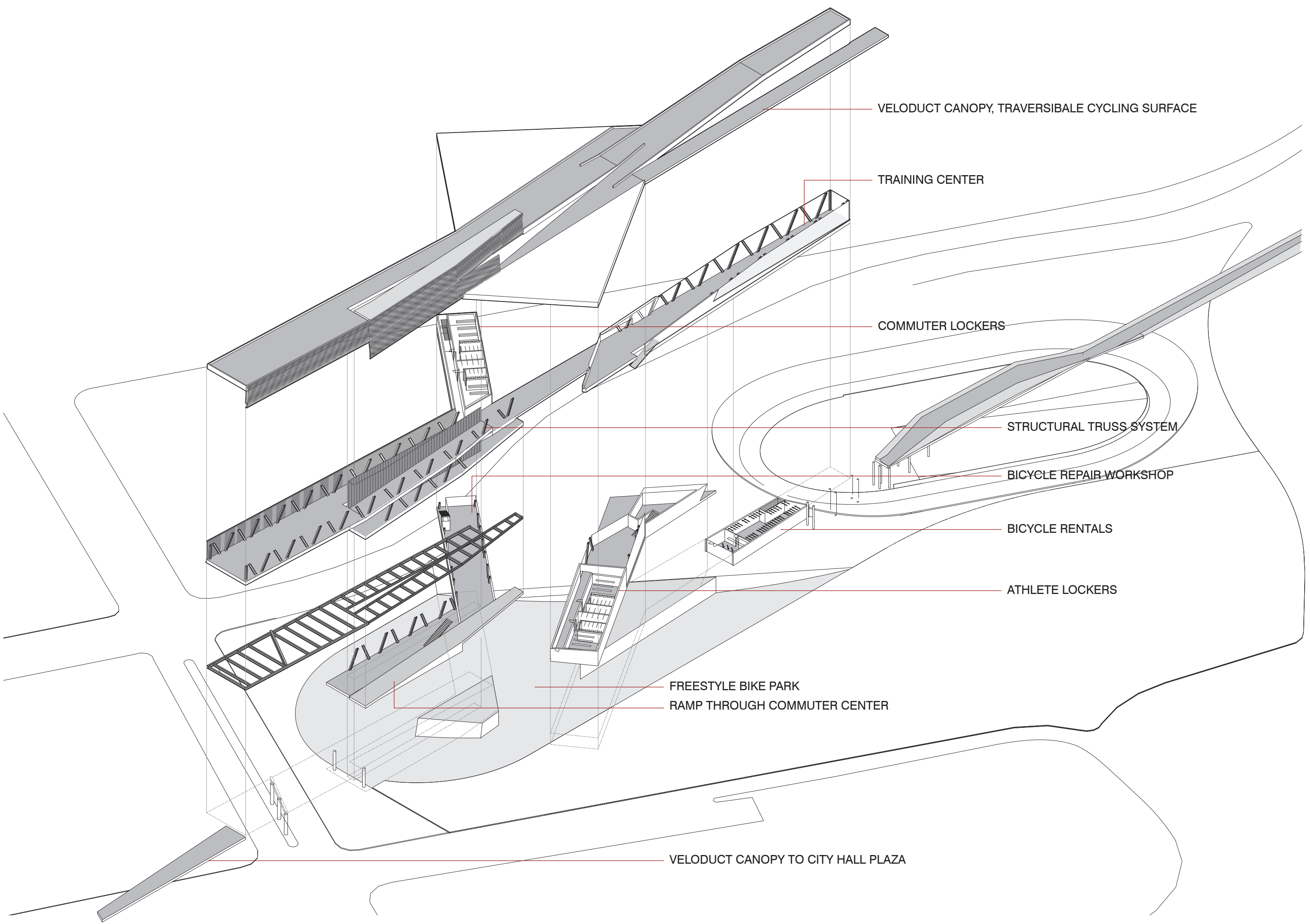


GROUND PLAN

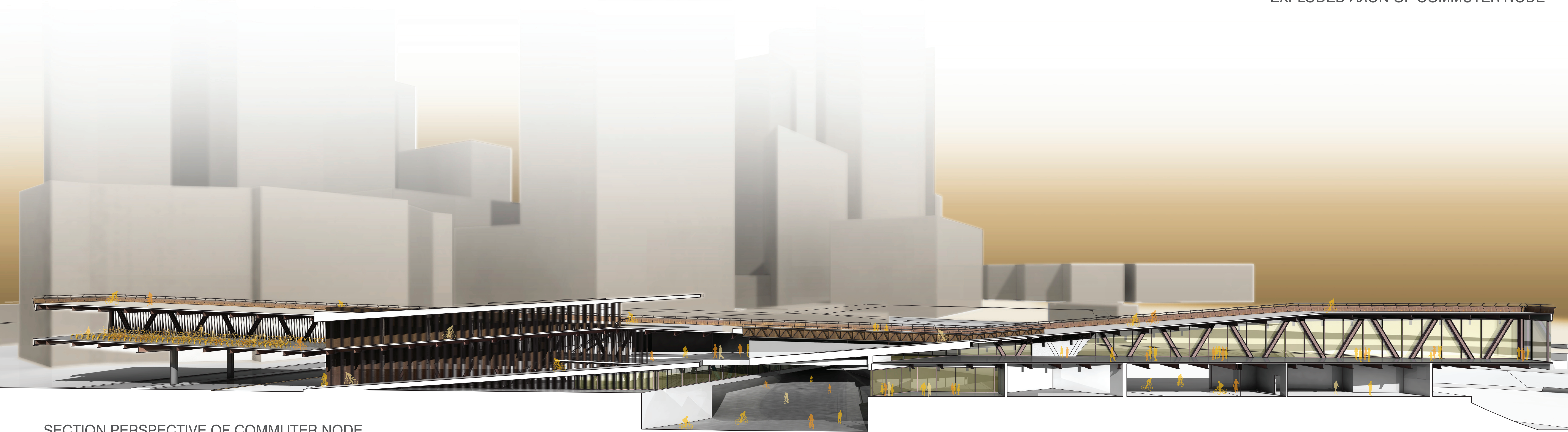




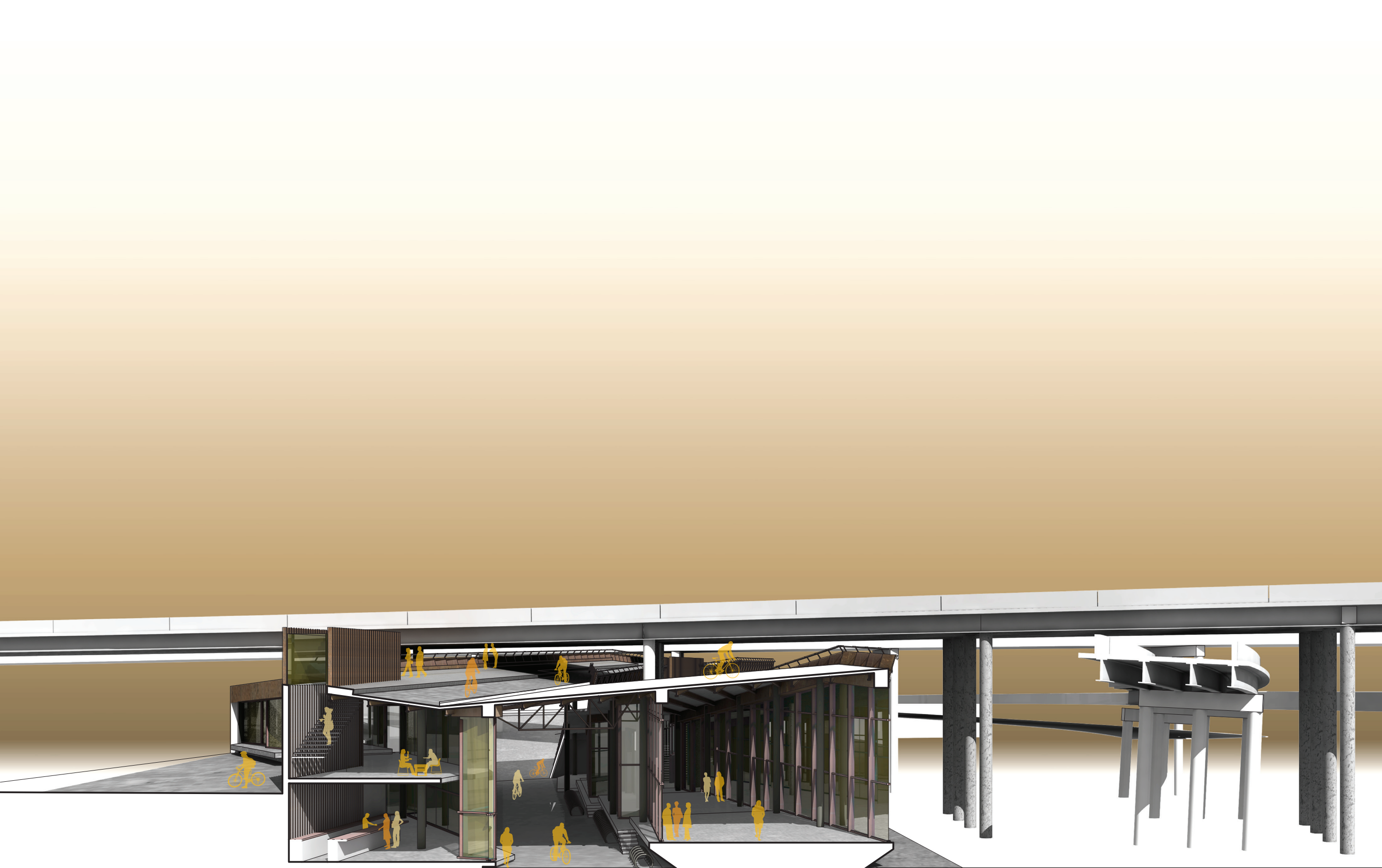
SECTION PERSPECTIVE OF COMMUTER NODE



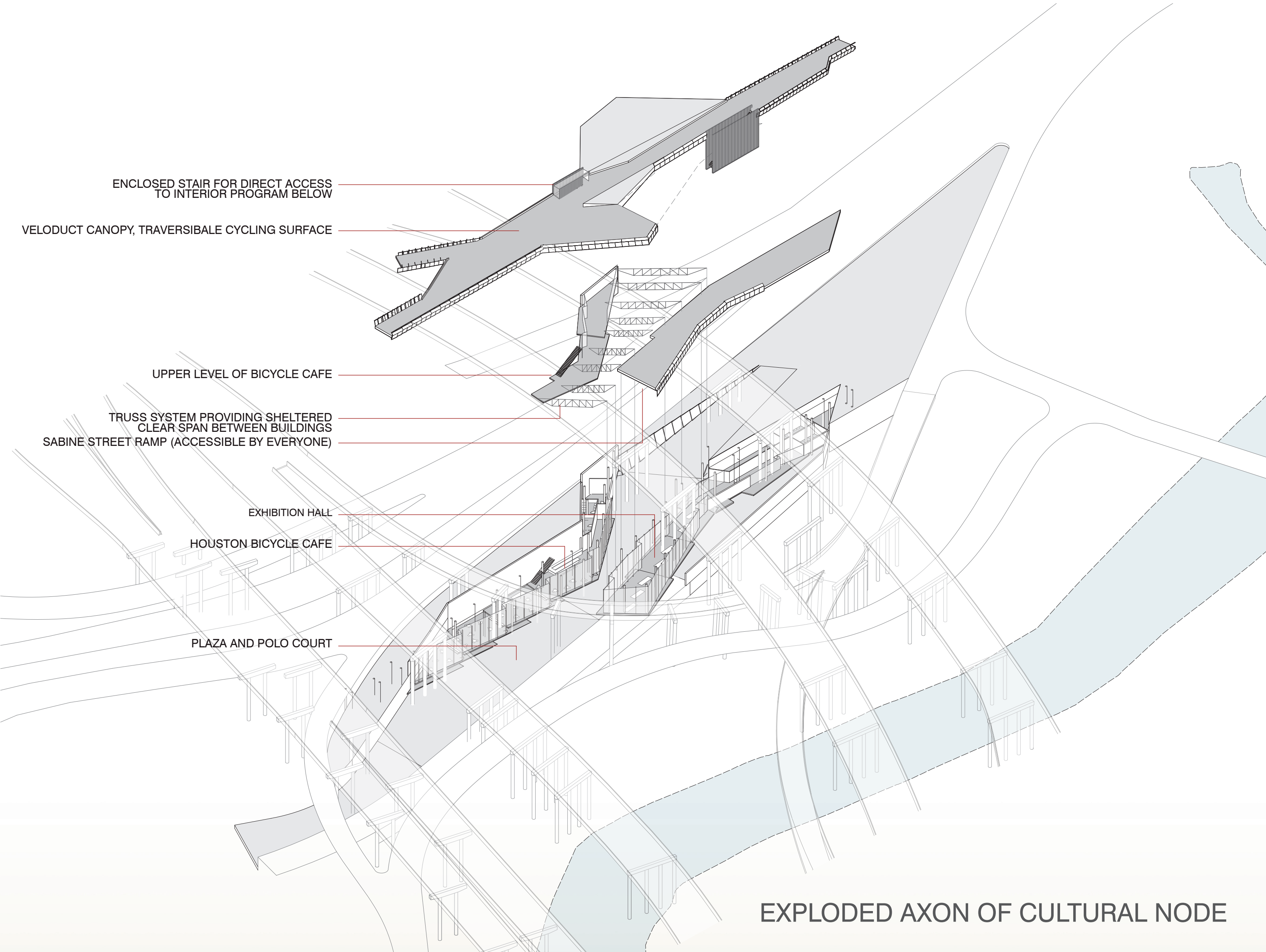
EXPLODED AXON OF COMMUTER NODE



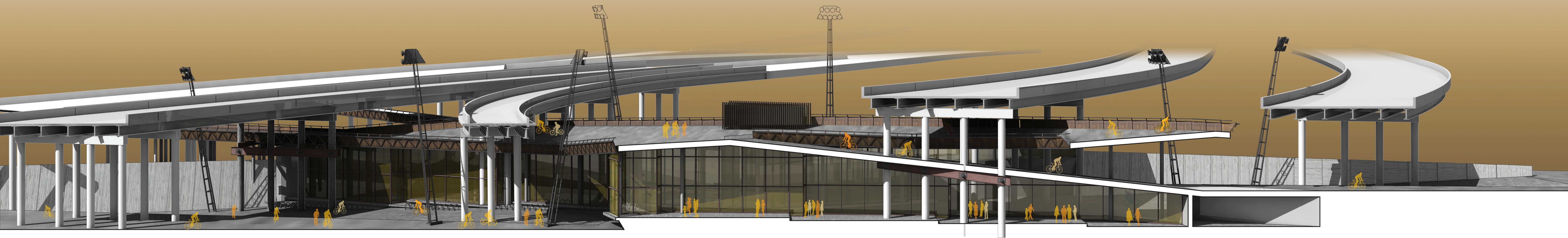
SECTION PERSPECTIVE OF COMMUTER NODE



SECTION PERSPECTIVE OF COMMUTER NODE



EXPLODED AXON OF CULTURAL NODE



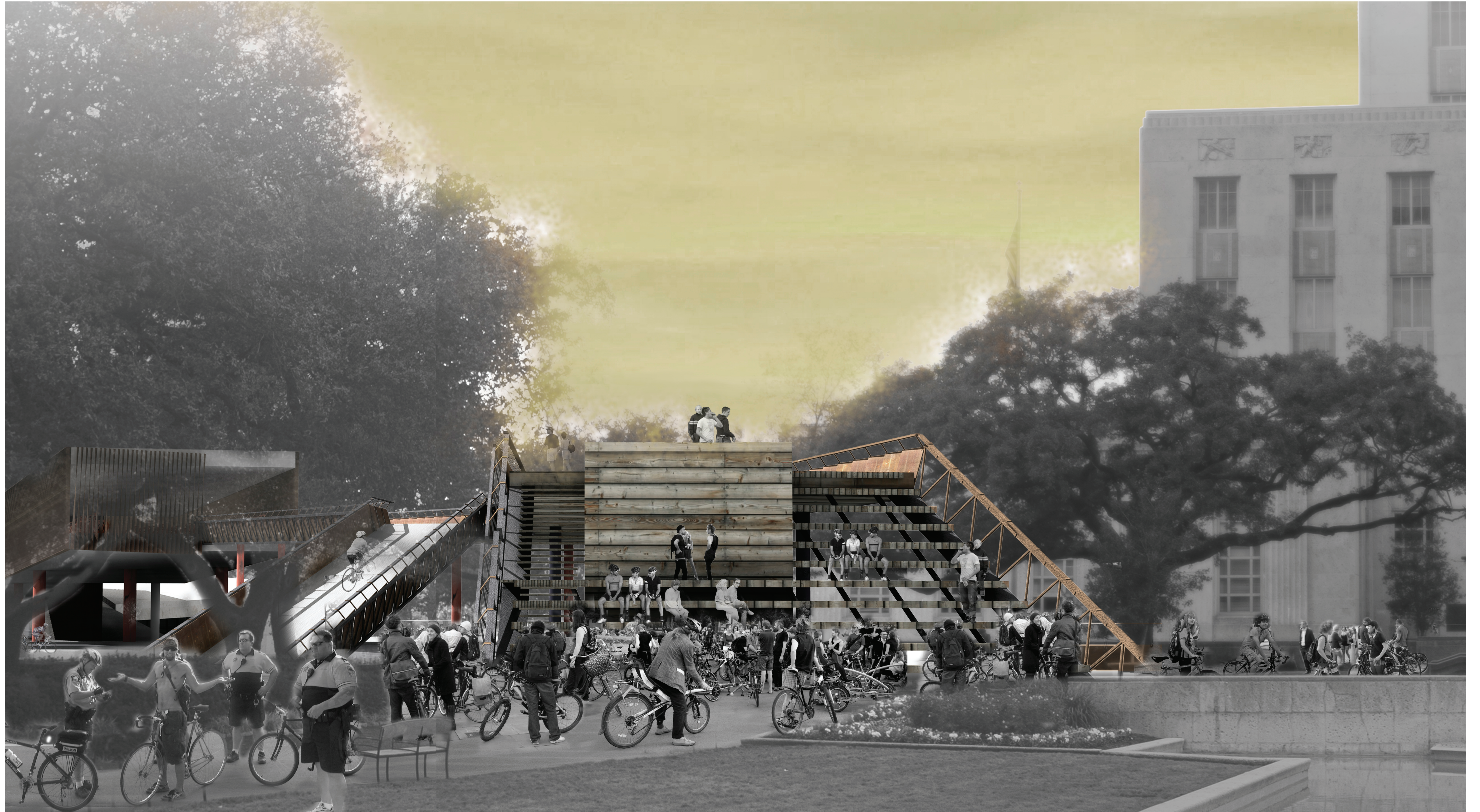
SECTION PERSPECTIVE OF COMMUTER NODE



BIKE POLO COURT UNDER FREEWAY OVERPASS



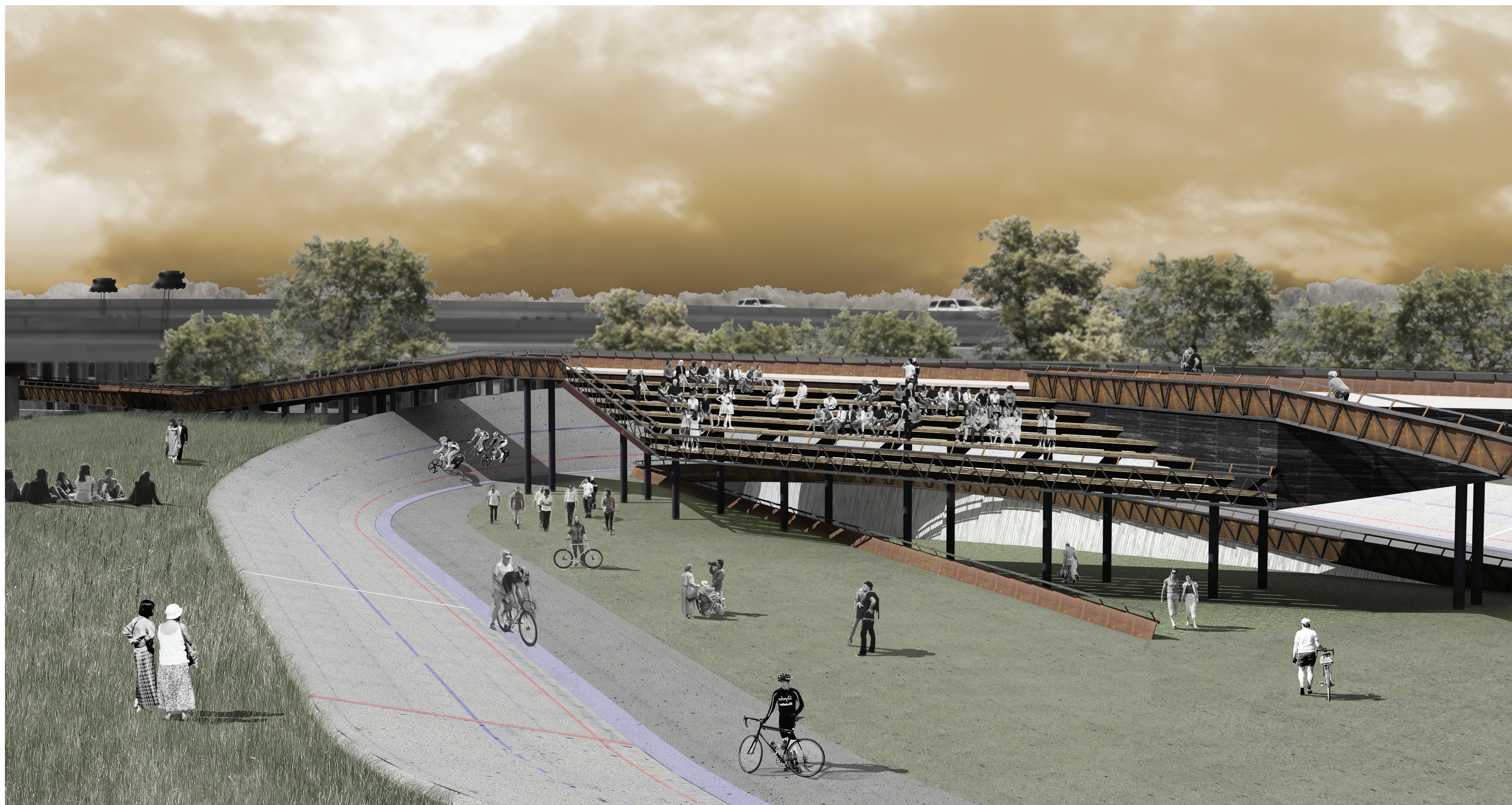
CAFE INTERIOR



PUBLIC STAIR AT CITY HALL PLAZA

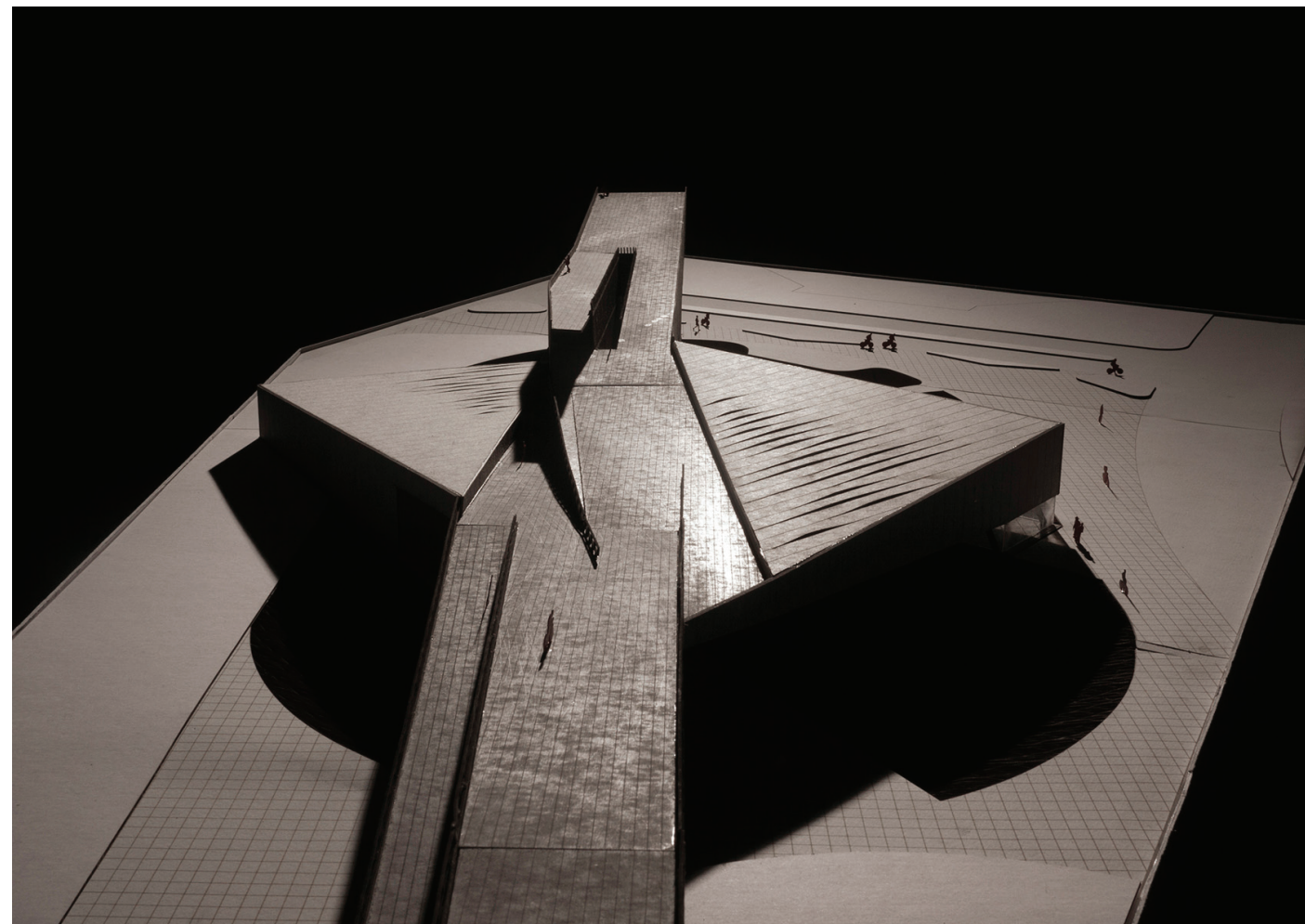


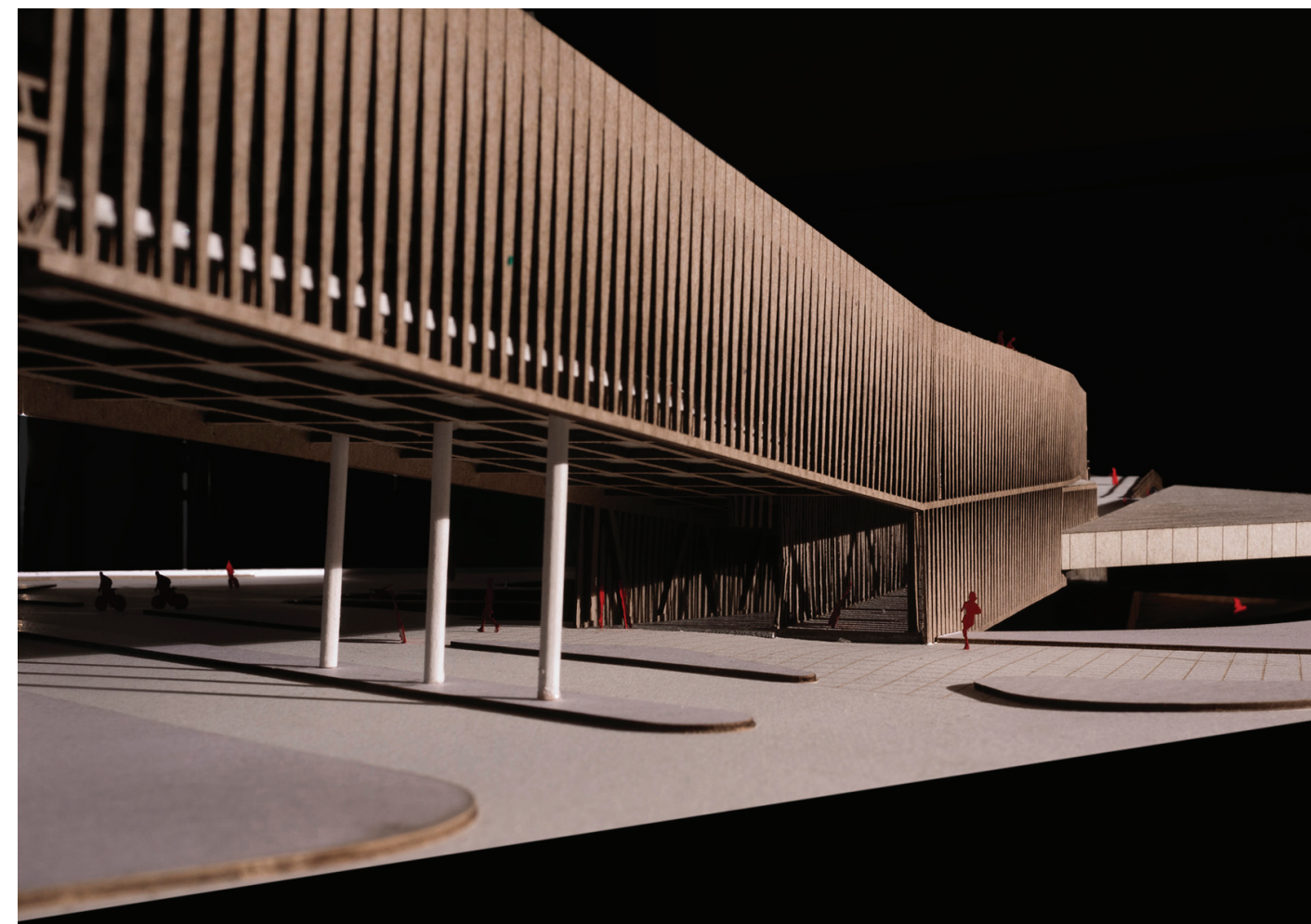
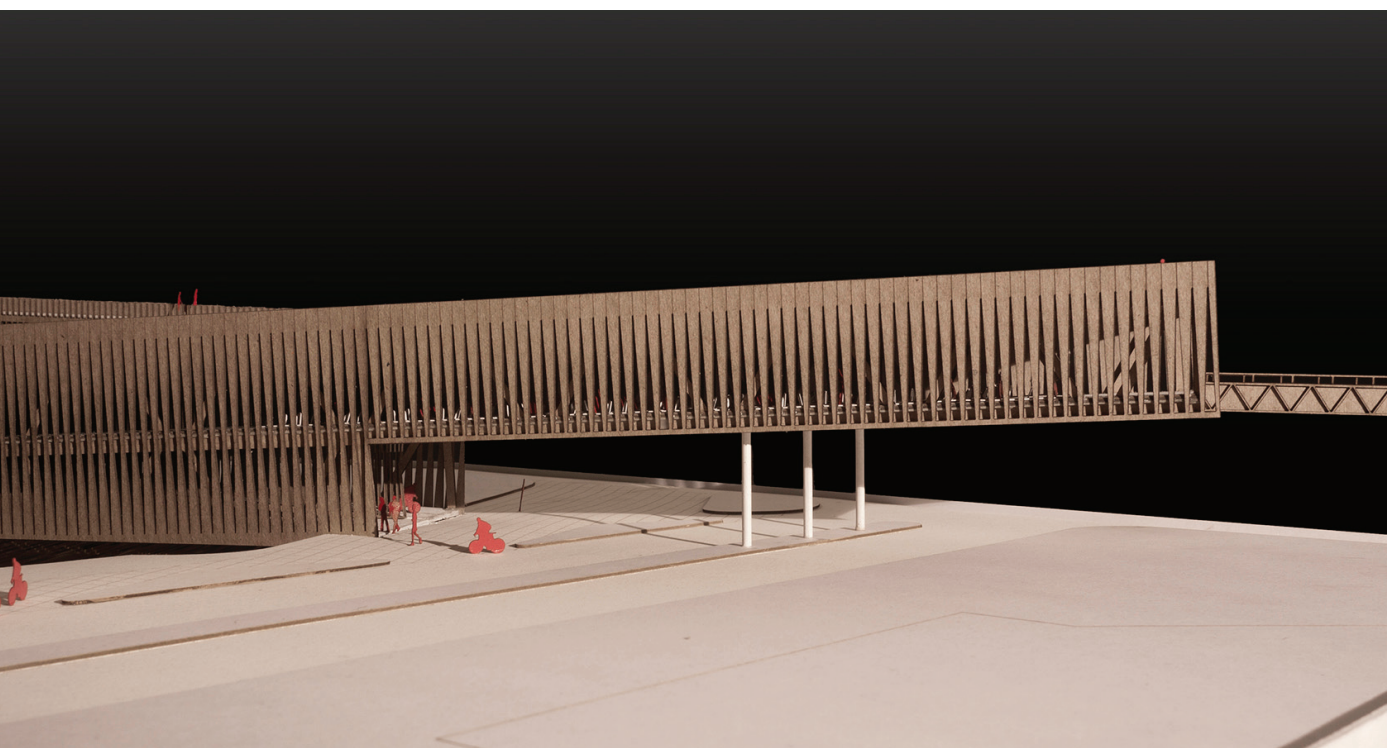
OVERLOOK AT BUFFALO BAYOU

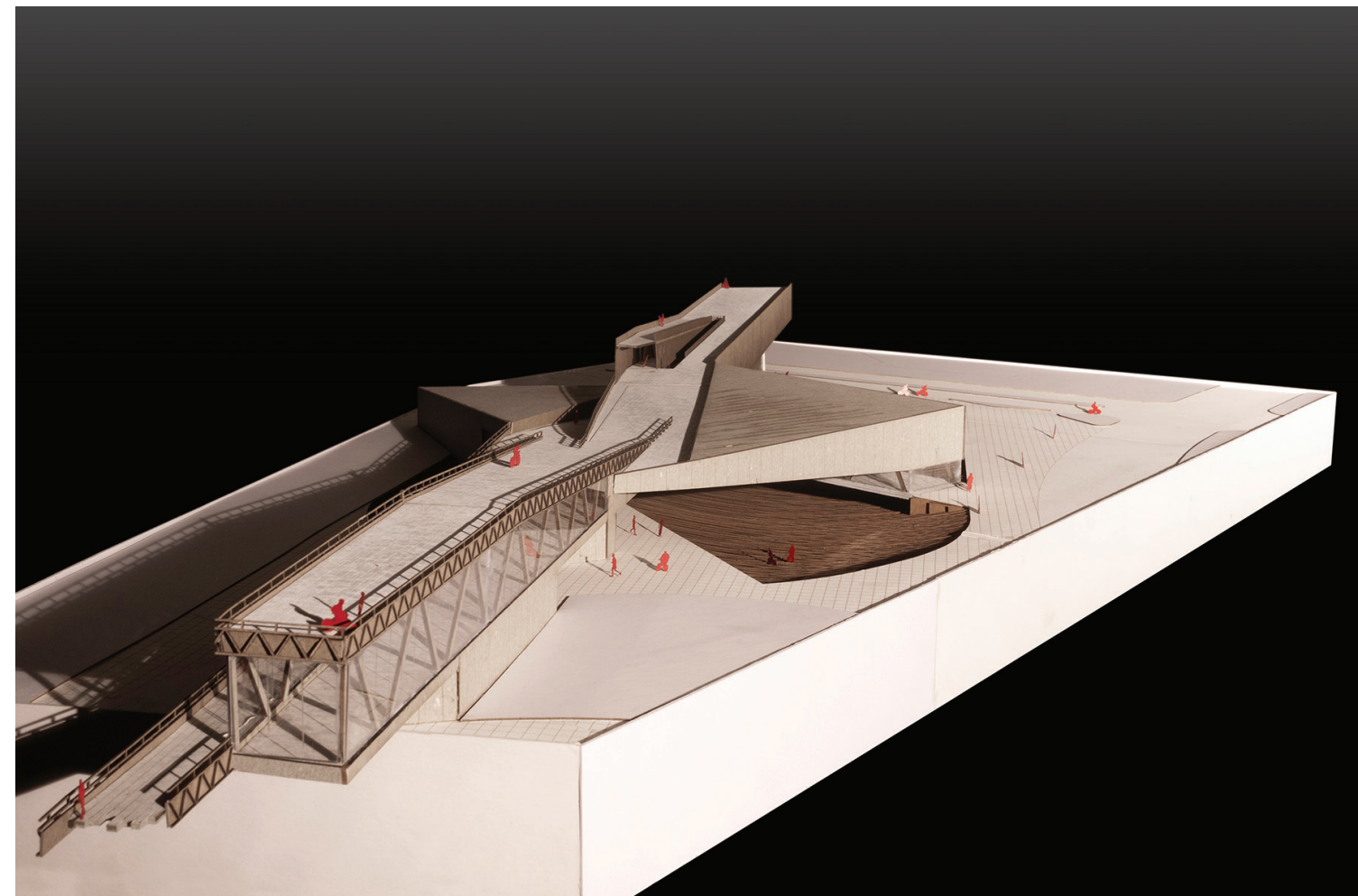
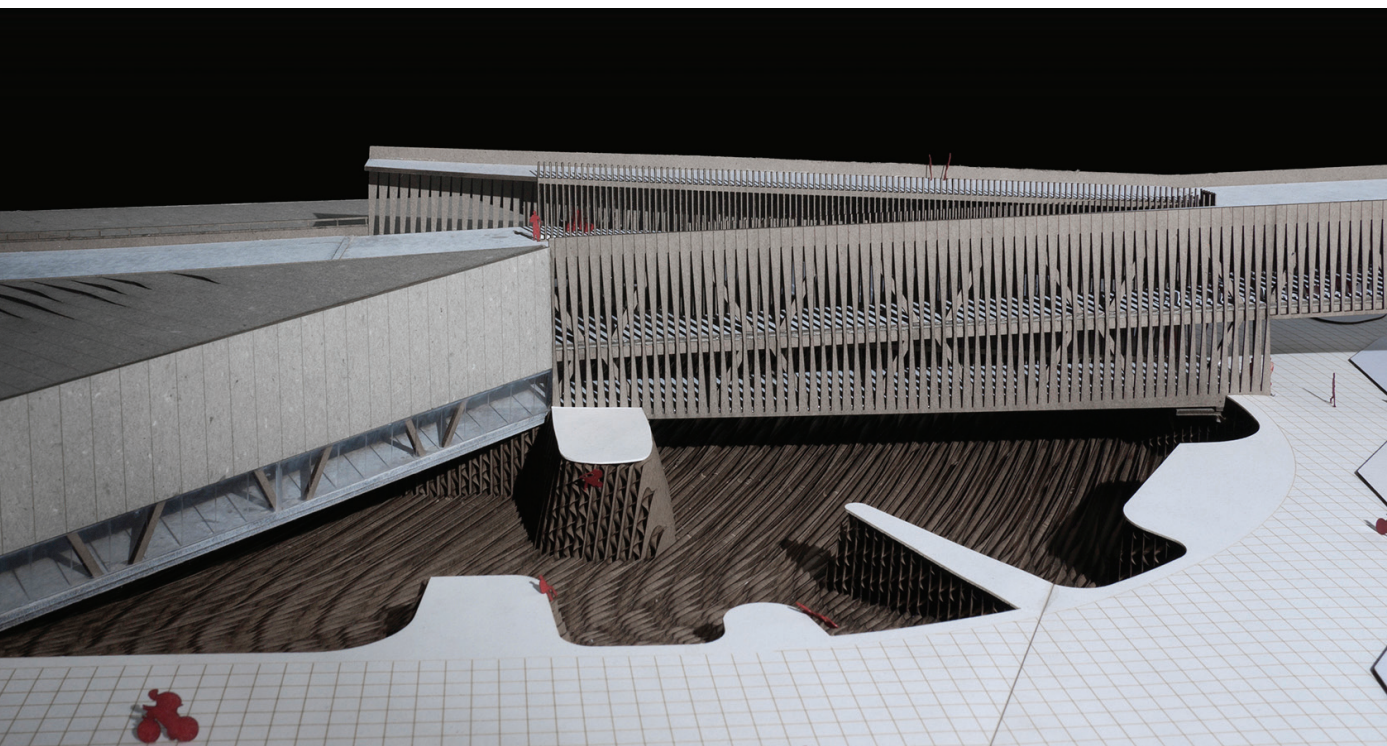
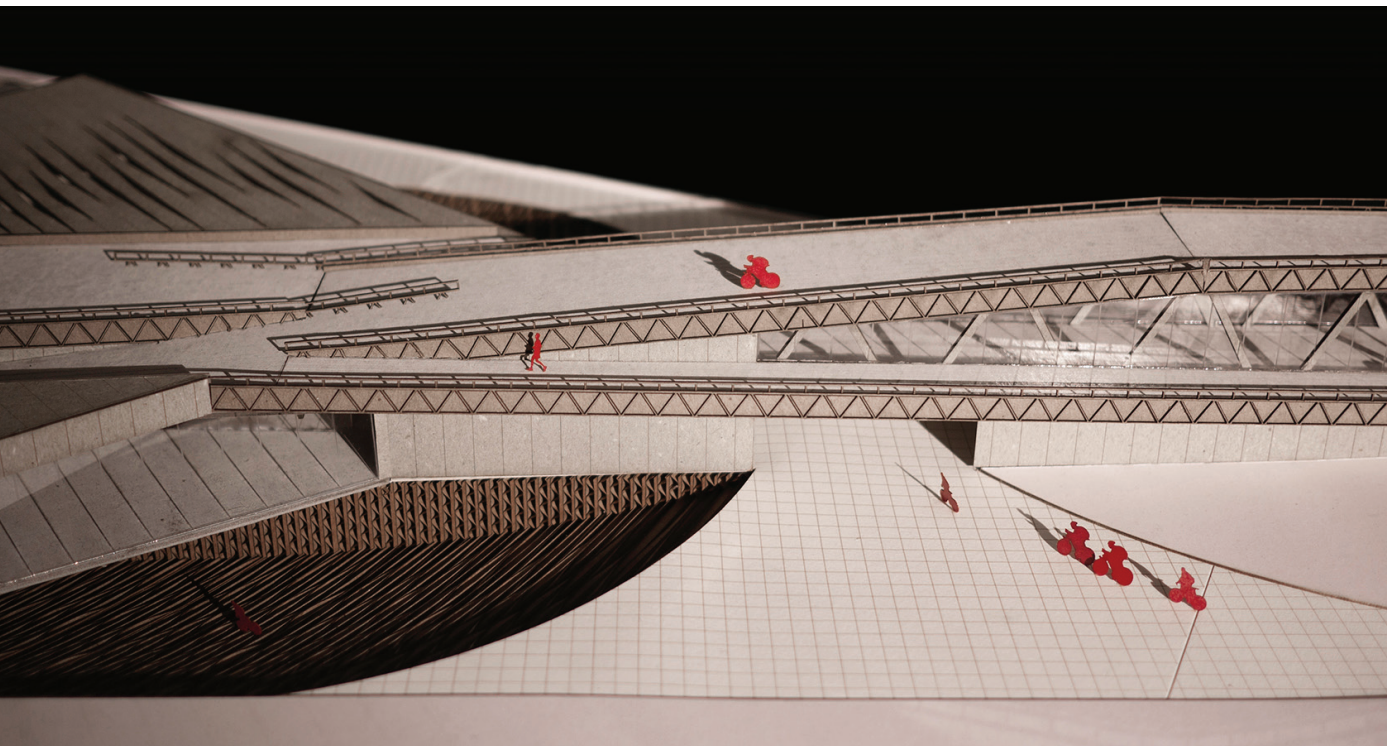


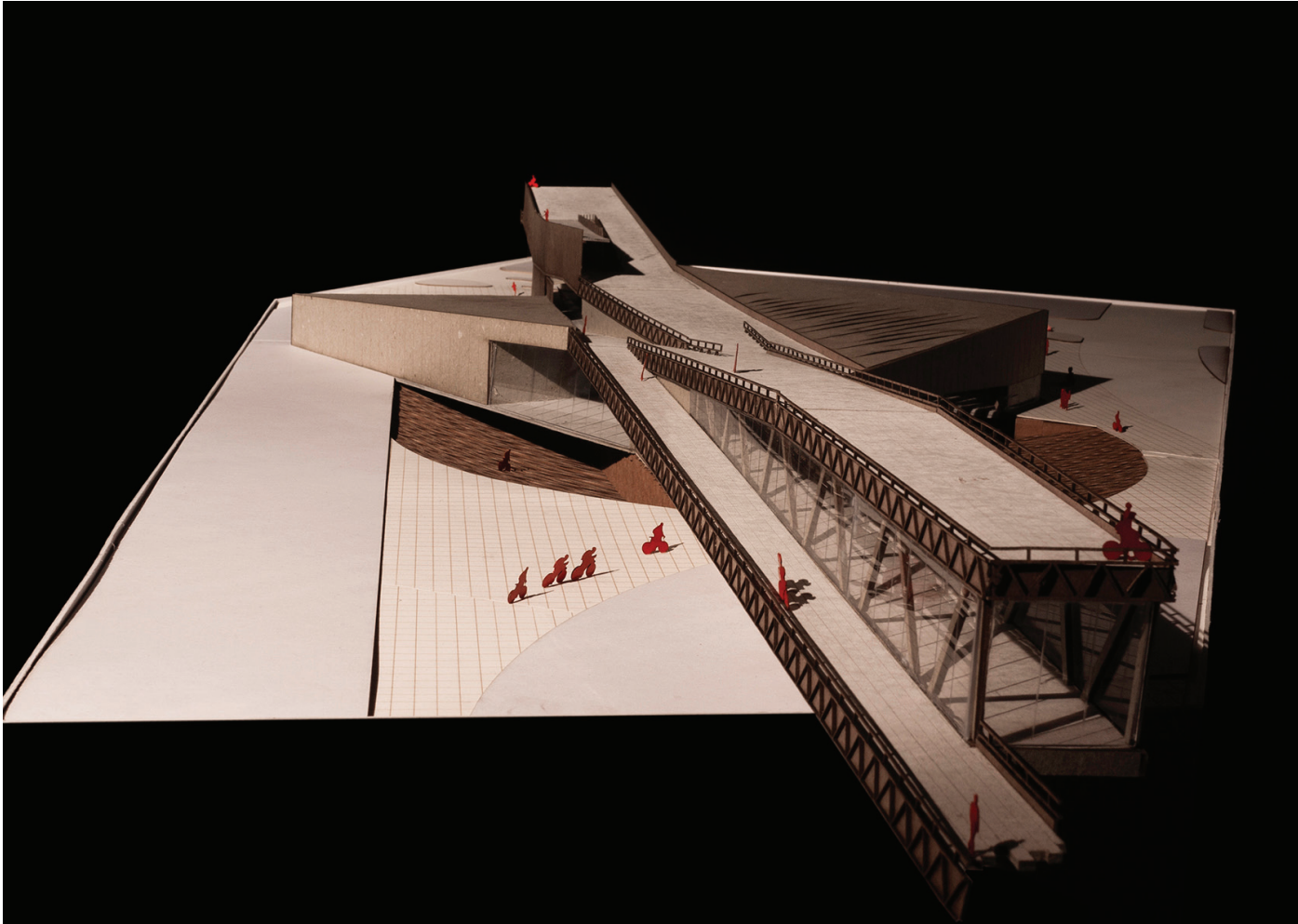
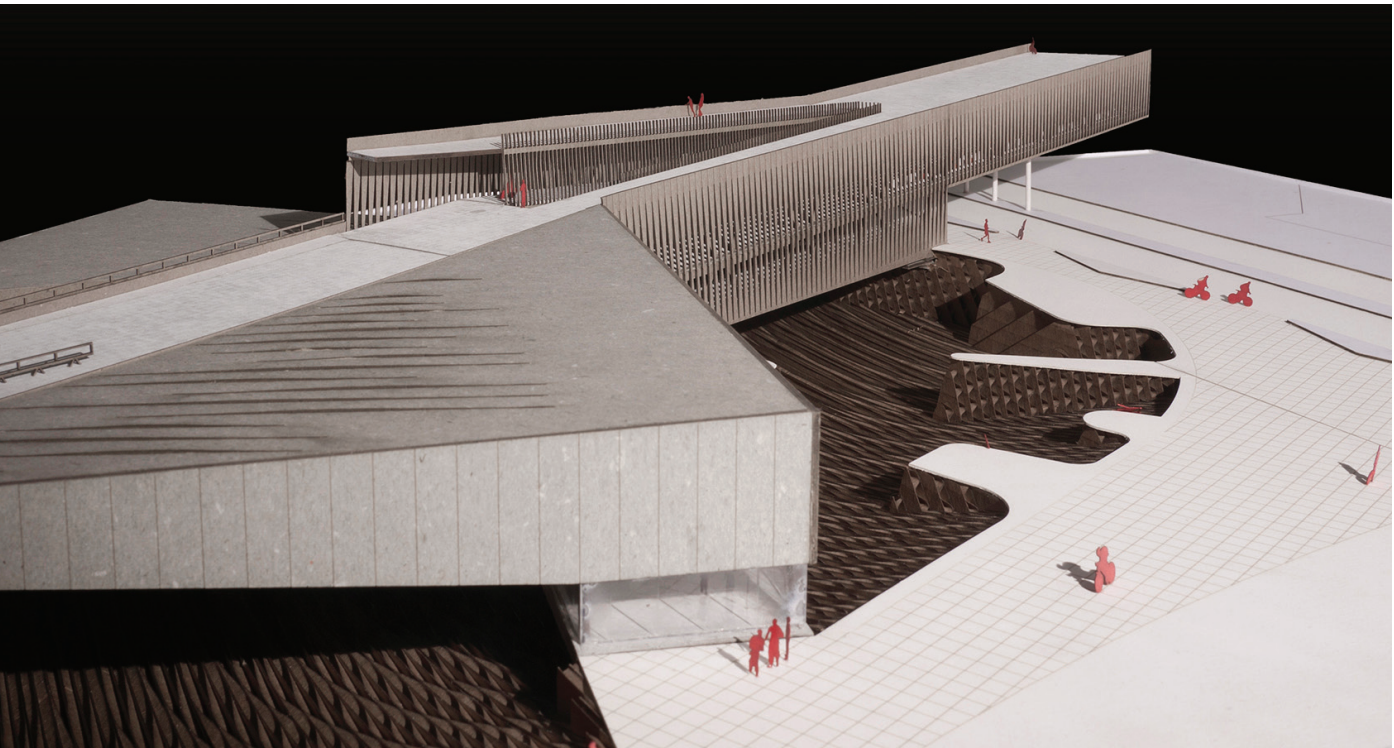
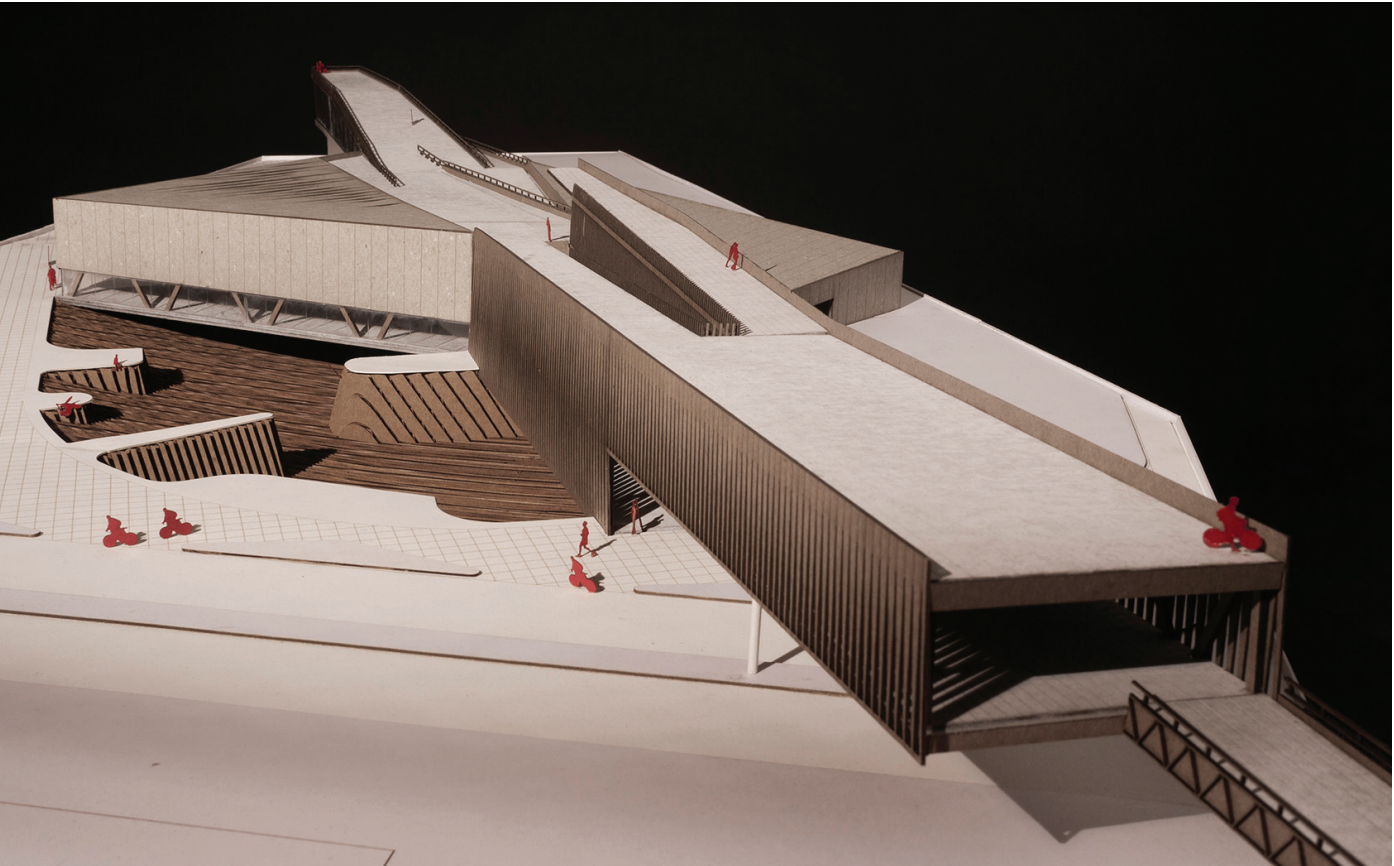
VELODUCT FLYOVER AT VELODROME

MODEL PHOTOS



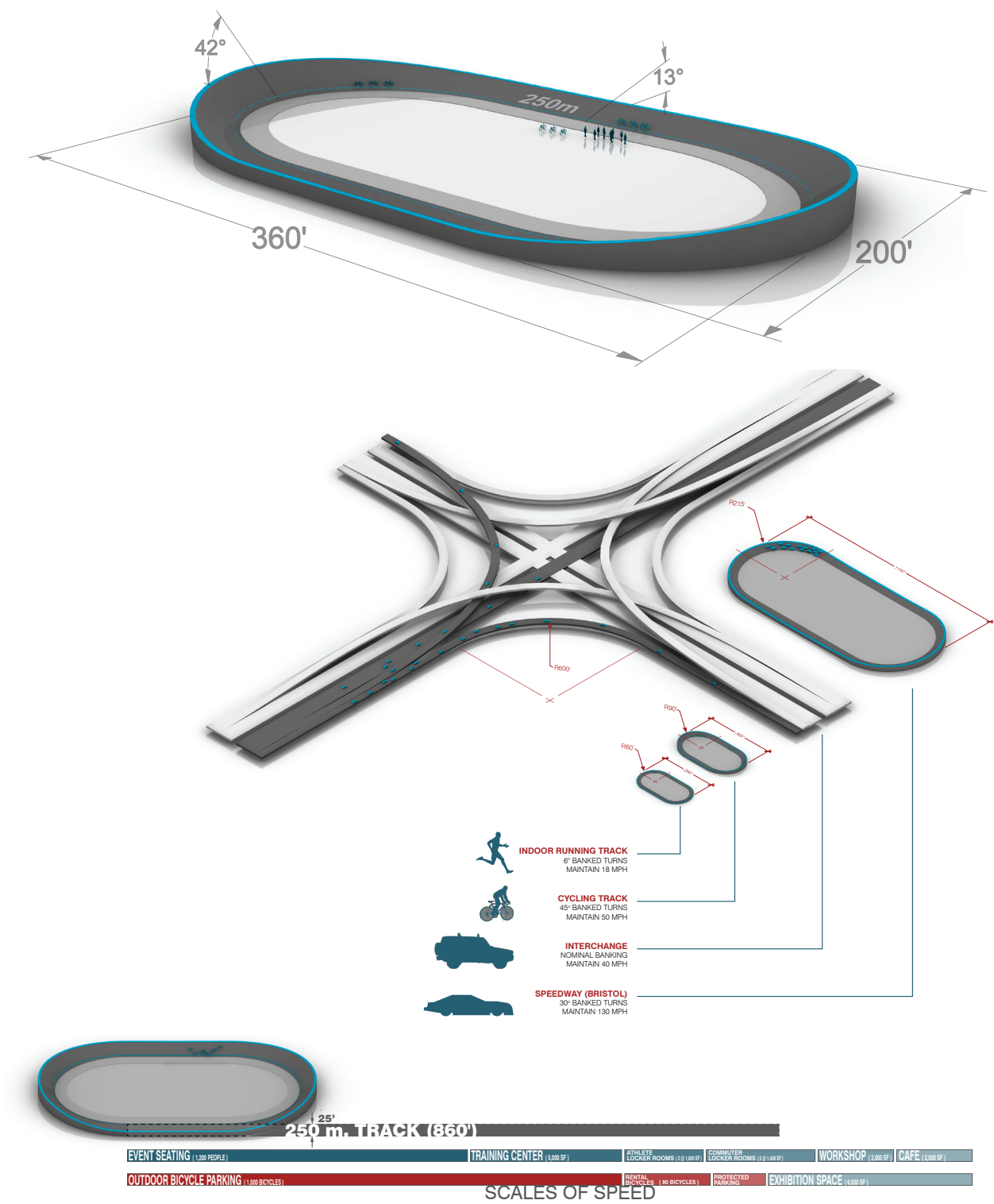




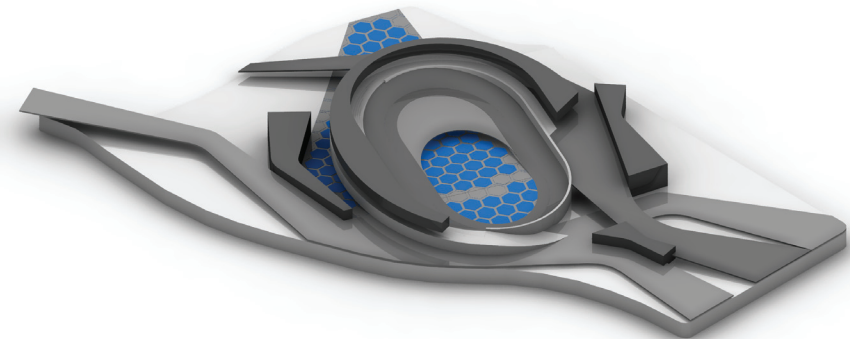
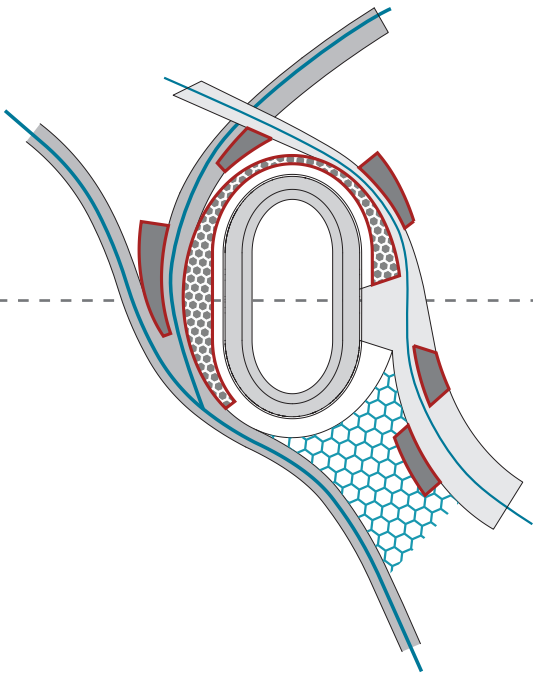
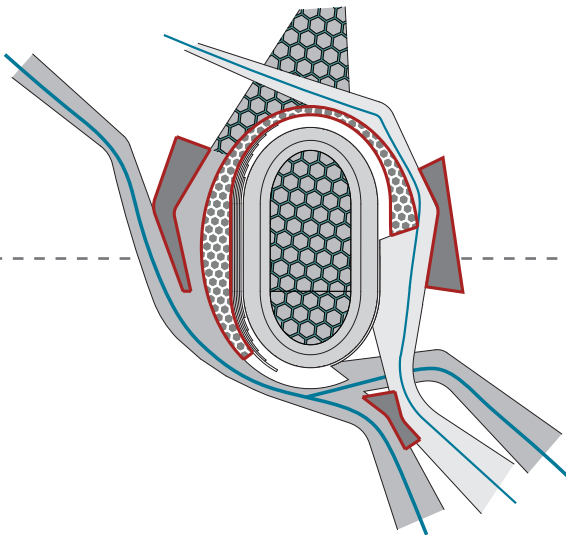
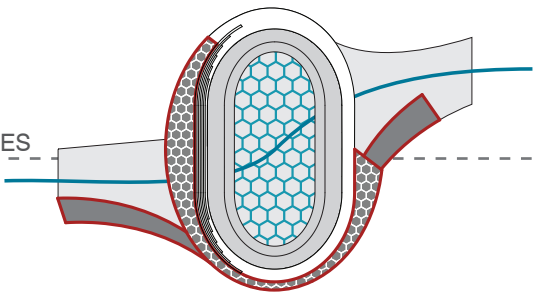


PROGRESS REVIEWS
INITIAL REVIEW

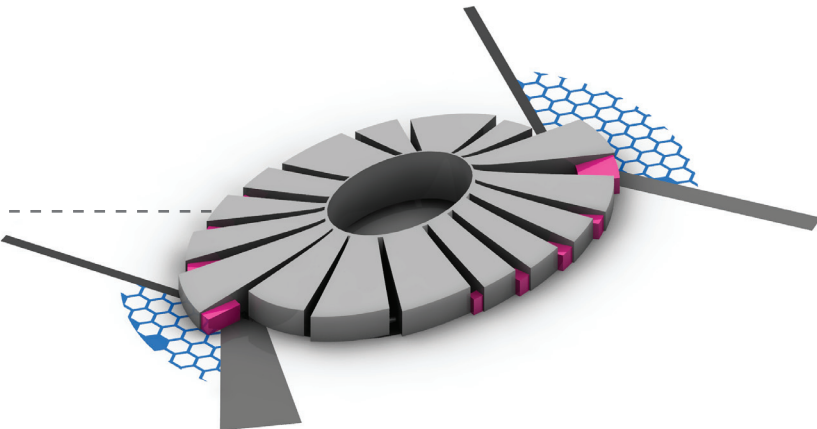
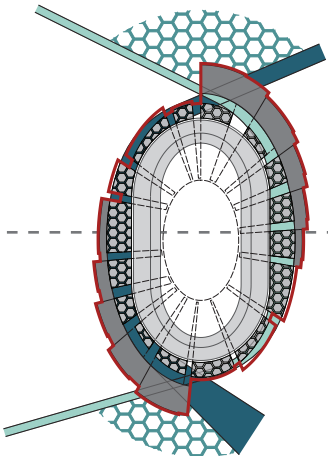
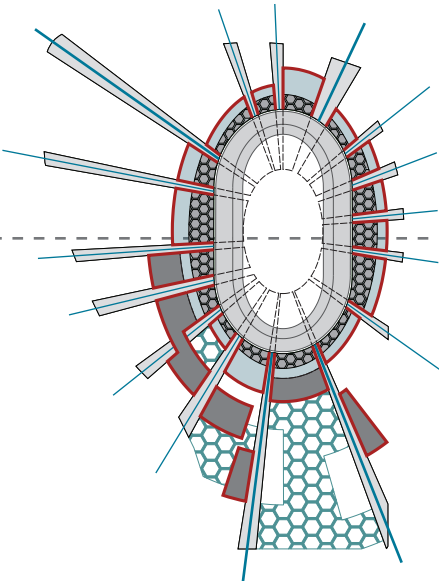
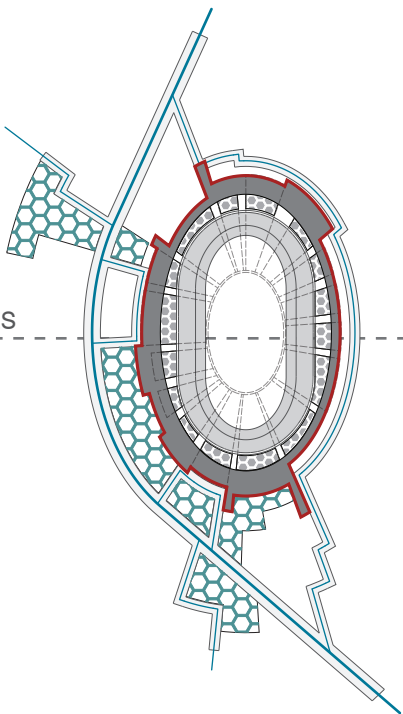
Initial studies focussed on stadium typologies with the main programmatic element consisting of a velodrome. Issues of scale, density, and circulation. The bicycle drove the programmatic decisions but did not yet influence the form, spatiality or experience of the site.



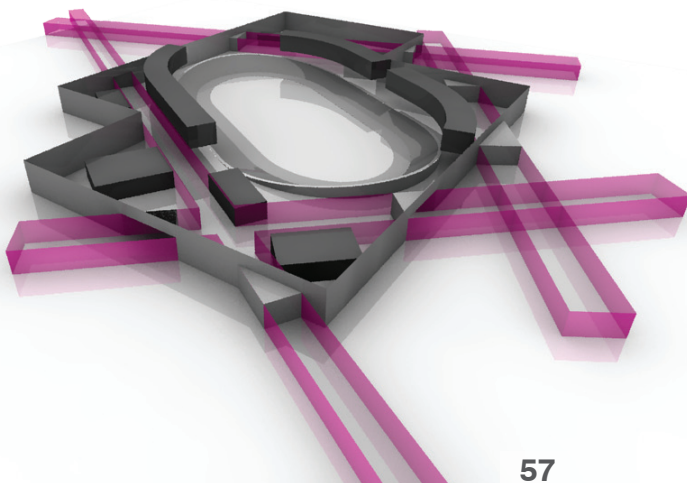
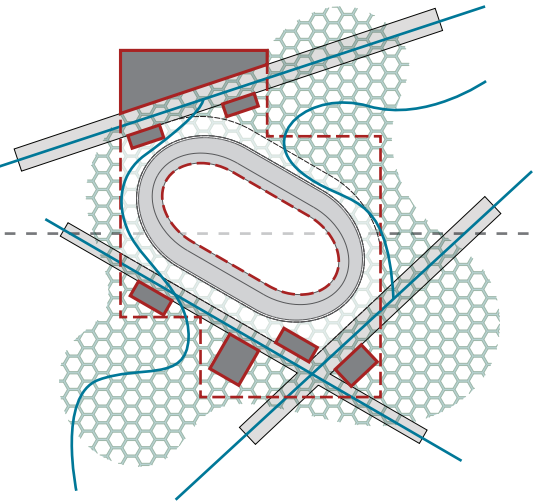
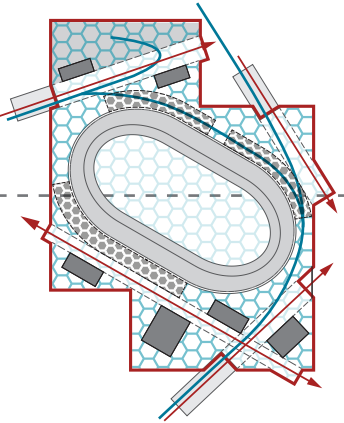
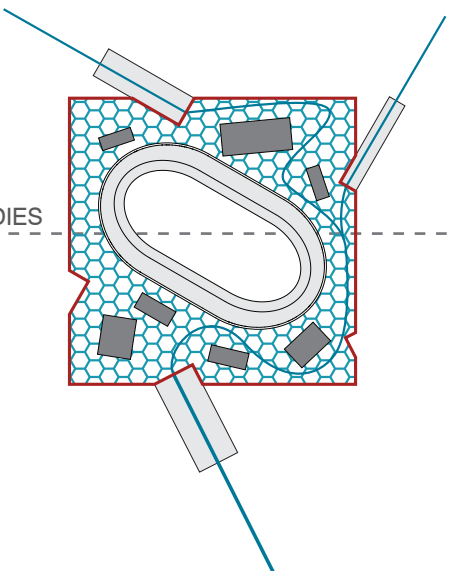
FIELD STUDIES



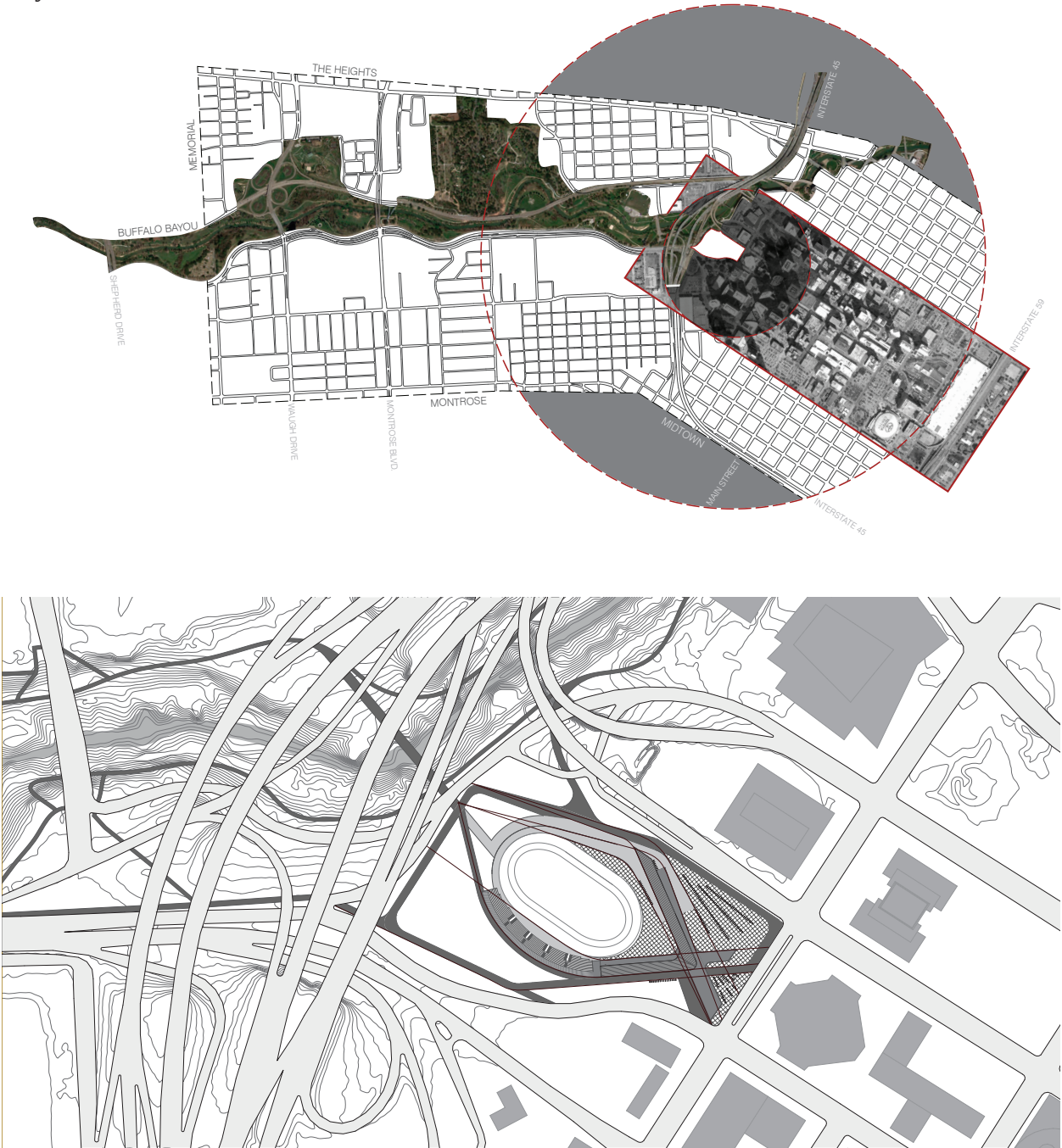
TIGHT FIT STUDIES

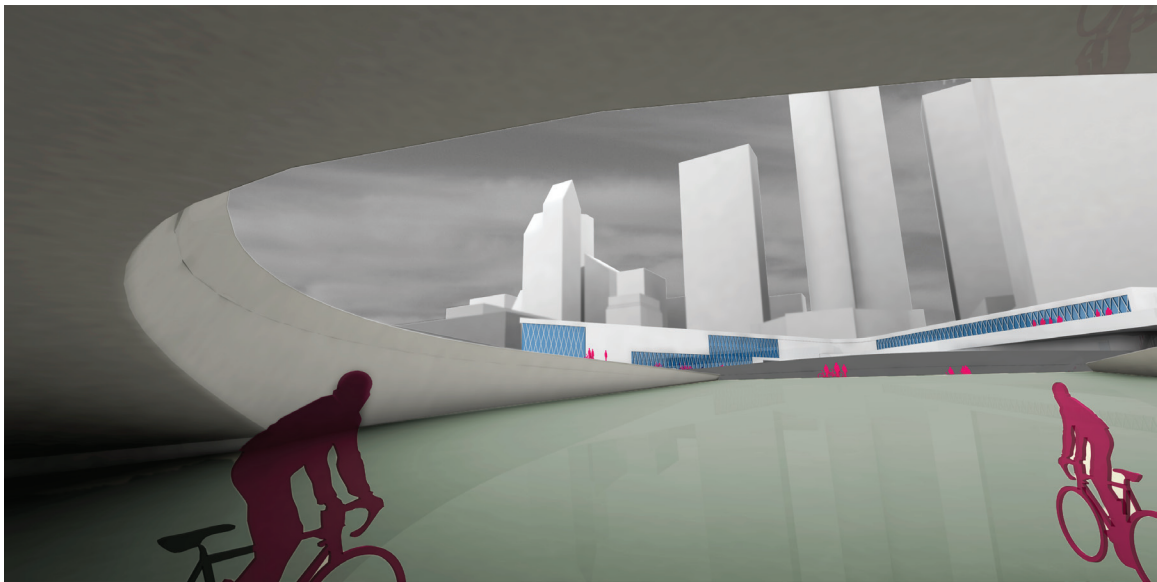
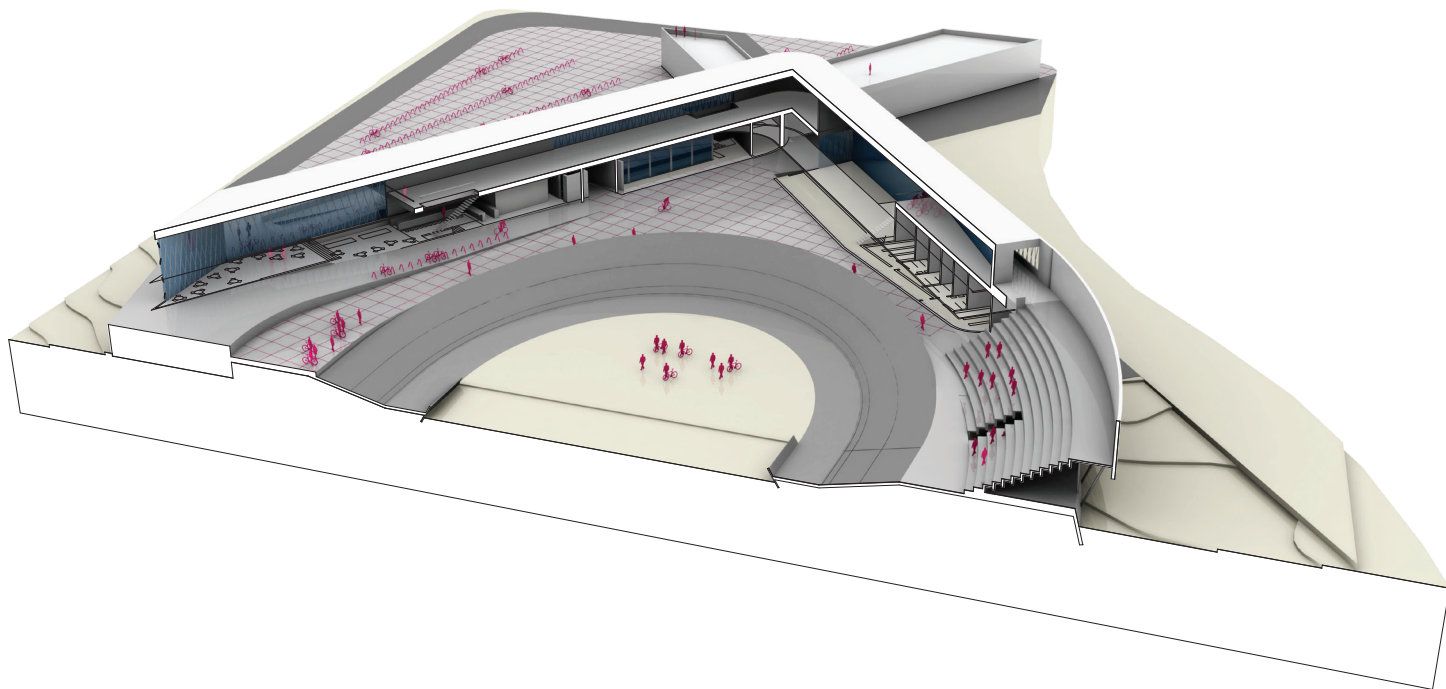
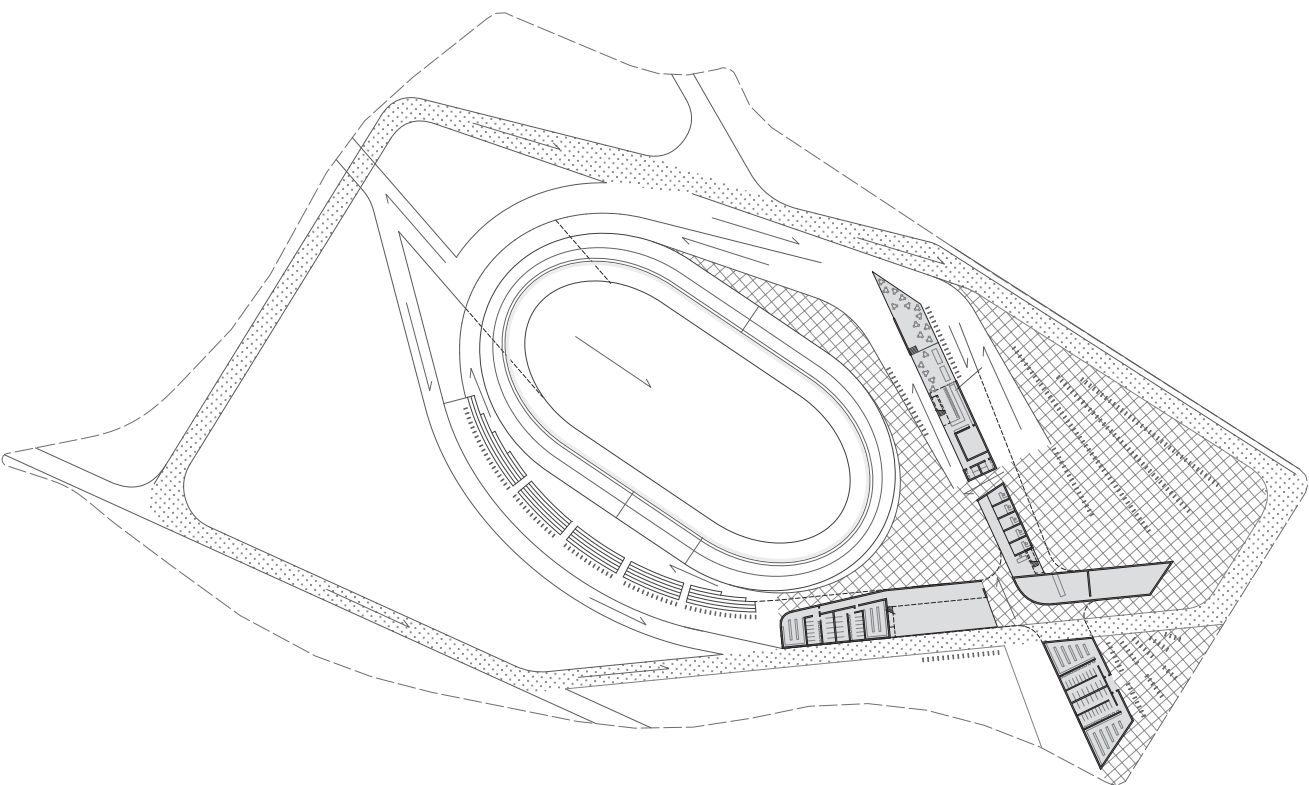
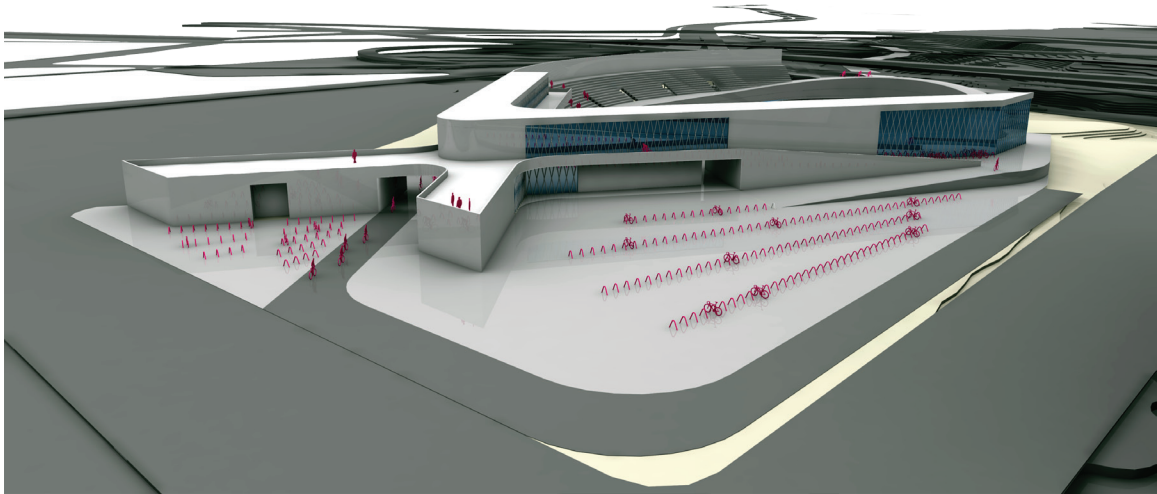


LOOSE FIT STUDIES



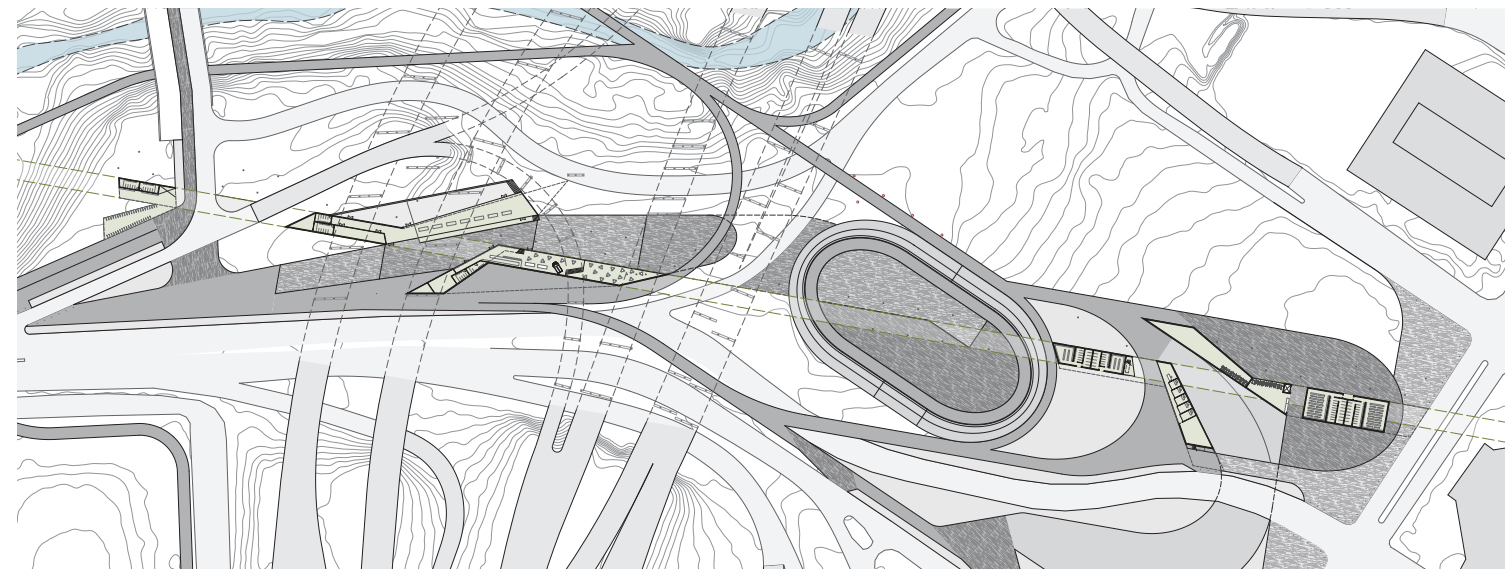
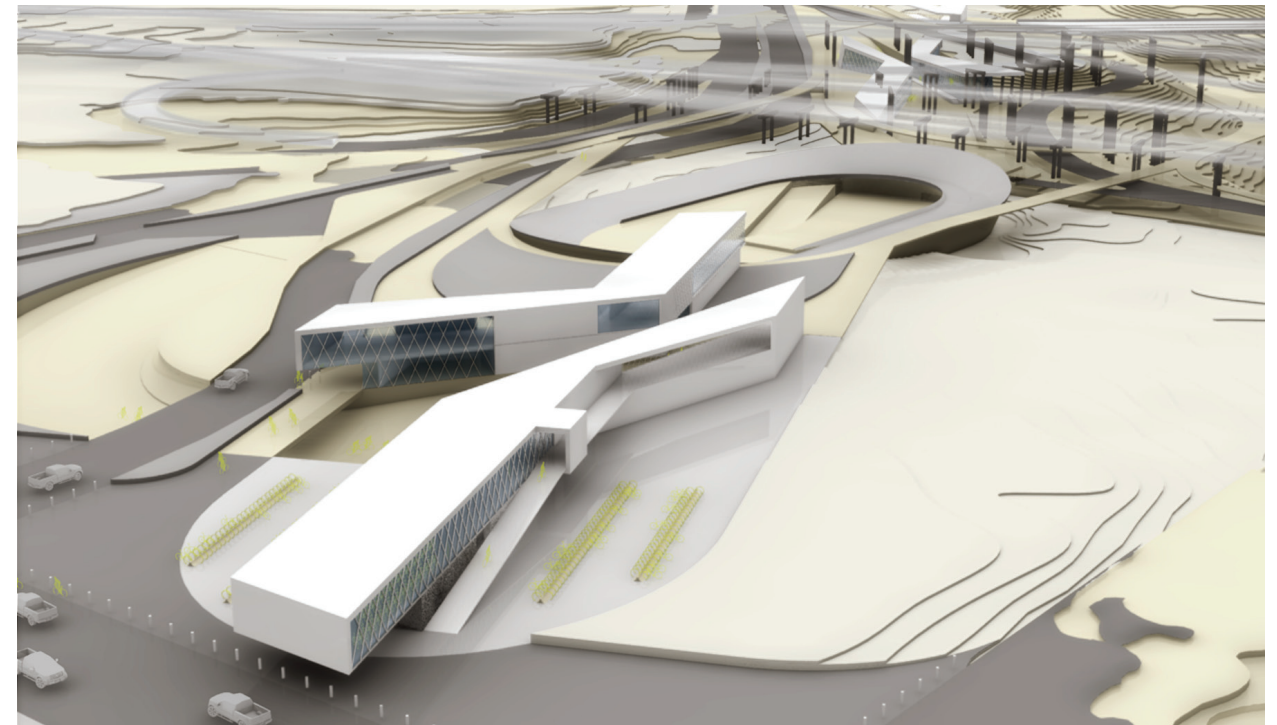
The architectural form emerged as the dominant element in this scheme. The velodrome still held great programmatic significance, but the ancillary program is given a strong formal expression. The X is derived from the circulation that traverses the site and responds to the mobility of the bicycle.





SCIENCE FAIR PRESENTATION

As the Velo-duct emerged as a concept it stretched beyond the boundaries of a traditional site. In fact the strategy now shifted to one intent on traversing boundaries. A strong formal bar was positioned as an organizing device to distribute program along its length. Prior to the inception of a canopy structure, the design still focussed on discreet architectural forms.



PROGRESS REVIEWS
SCIENCE FAIR PRESENTATION

